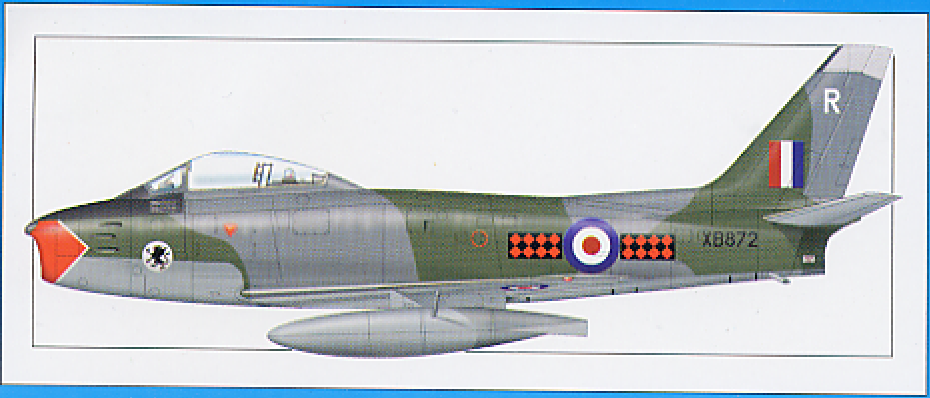


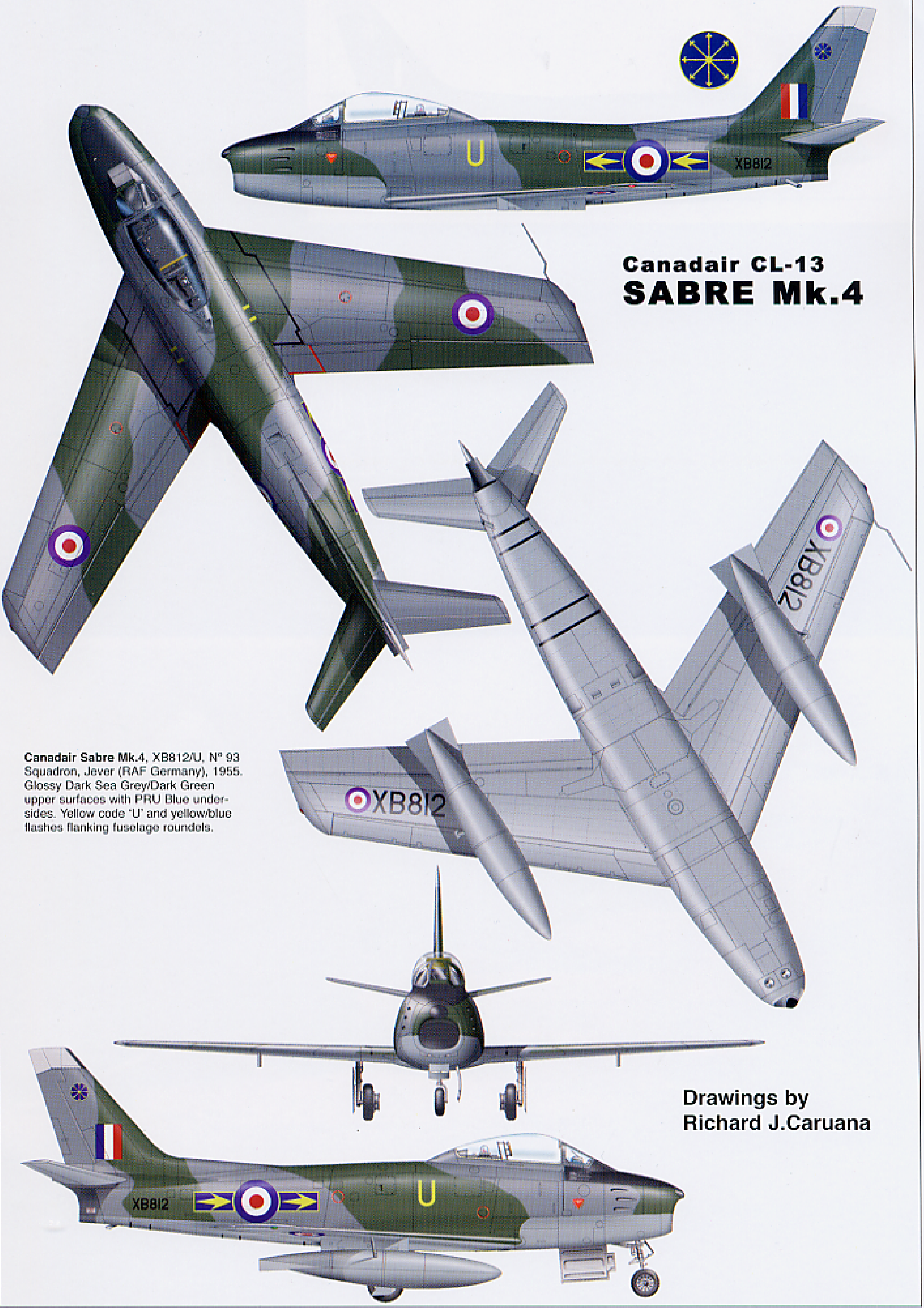
WARPAINT SERIES No.40

Canadair and Commonwealth SABRE

BY STEVE HAZELL

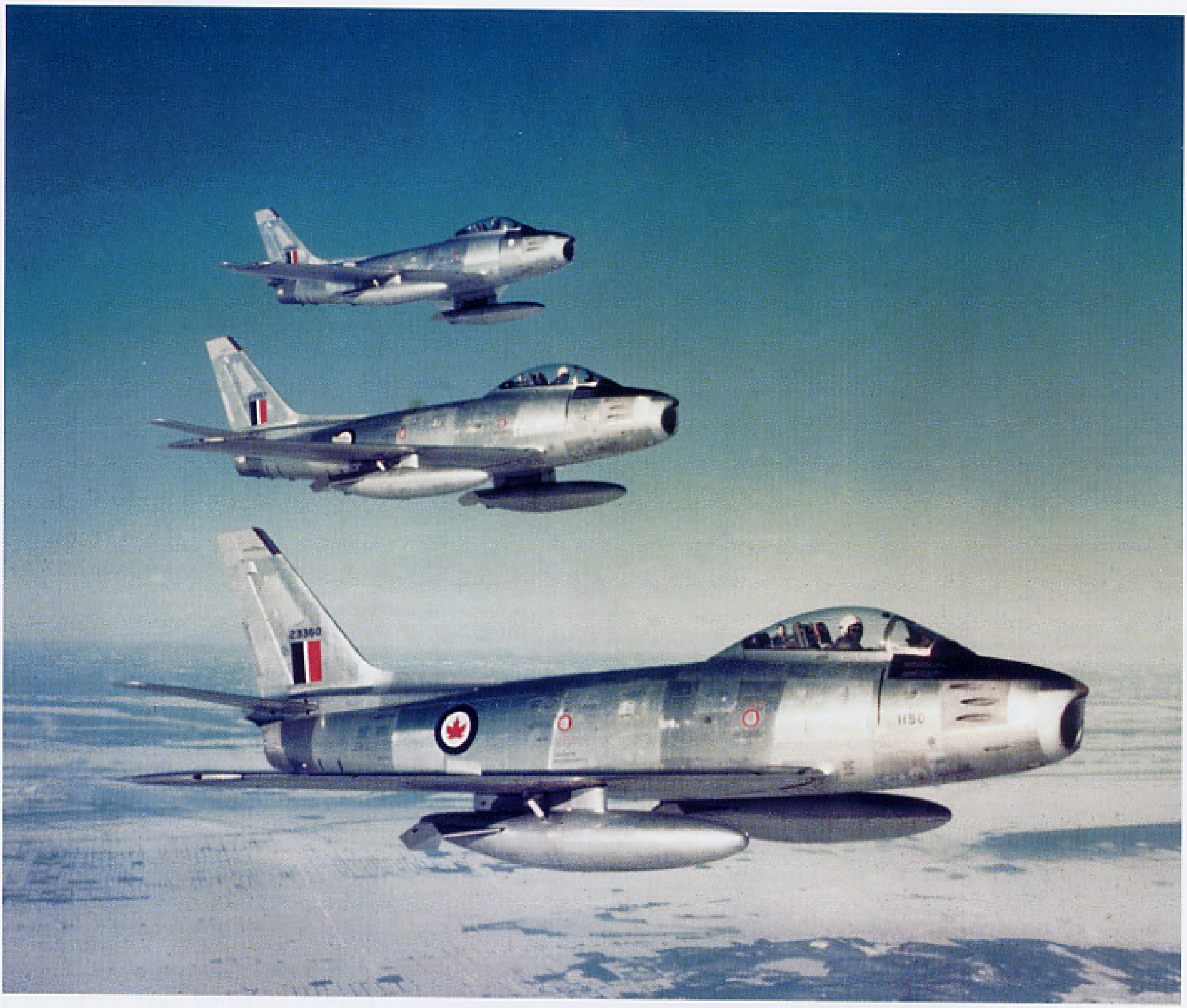
The six Canadair Sabres that made up the Golden Hawks aerobatic team of the Royal Canadian Air Force. The team used both the Mk.5 and Mk.6 version of the aircraft between March 1959 and February 1964. (Terry Panapolis)

Canadair CL-13
SABRE Mk.4



Canadair Sabre Mk.4, XB812/U, Nº 93 Squadron, Jever (RAF Germany), 1955. Glossy Dark Sea Grey/Dark Green upper surfaces with PRU Blue undersides. Yellow code 'U' and yellow/blue flashes flanking fuselage roundels.

Drawings by
Richard J.Caruana



A trio of three Sabre Mk.5s on a pre-delivery flight near Montreal. They were being flown by pilots of the Overseas Ferry Unit in September 1954. (via Terry Panopalis)

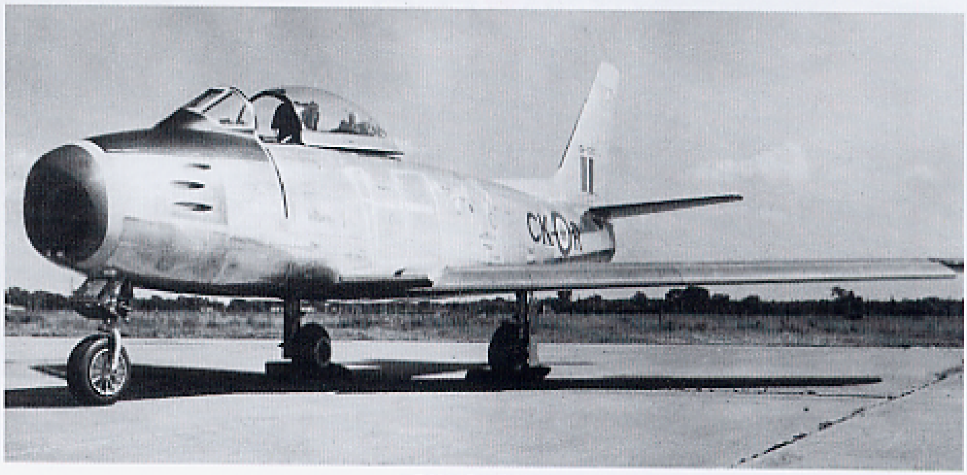
Canadair CL-13 and Commonwealth CA-27

SABRE

By Steve Hazell

It is strange to recall today that when World War 2 ended the centre for the research, development and production of jet-powered aircraft lay in Europe and not across the Atlantic Ocean in the United States. Research into aeronautical jet engines had begun before the outbreak of war, most especially in the United Kingdom and Germany where designers soon set about producing suitable airframes to utilise the radical new power-plant. Each country worked quite independently to build a practical jet aeroplane but the outbreak of war in 1939 introduced a new sense of urgency, as well as an even higher level of secrecy which shrouded everything connected with jet-powered flight.

By 1945 both Britain and Germany had operational jet aircraft in production with Britain arguably ahead in jet engine design and Germany in research into high-speed flight and aircraft design. The UK had two operational jet fighters – the DeHavilland Vampire and the Gloster Meteor, and of the German aircraft it was the Messerschmitt Me 262 which showed most promise and which, had the war continued, would probably have been developed into a truly potent interceptor. Where the Me 262 differed most noticeably from the Meteor was in its wing planform, featuring swept wings rather than the Meteor's traditional straight wing. This was an innovation that theoretically allowed the Me 262 to achieve much higher speeds than the Meteor, and it was this advanced aerody-

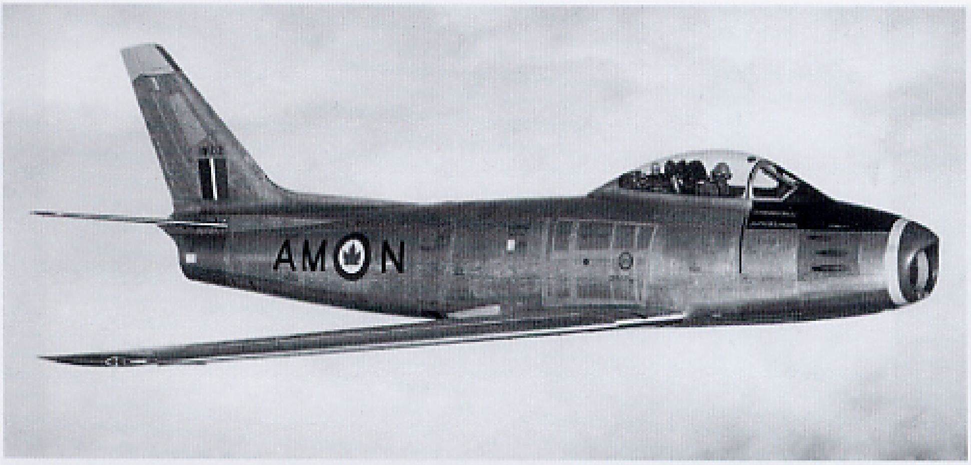


The first Canadair Sabre Mk.1 serialled 19101, was built from parts supplied by North American and was in fact identical to an F-86A. It made its first flight on 9 August 1950. (via Terry Panopalis) namic theory, the result of a lengthy German research programme, which the Allies lacked.

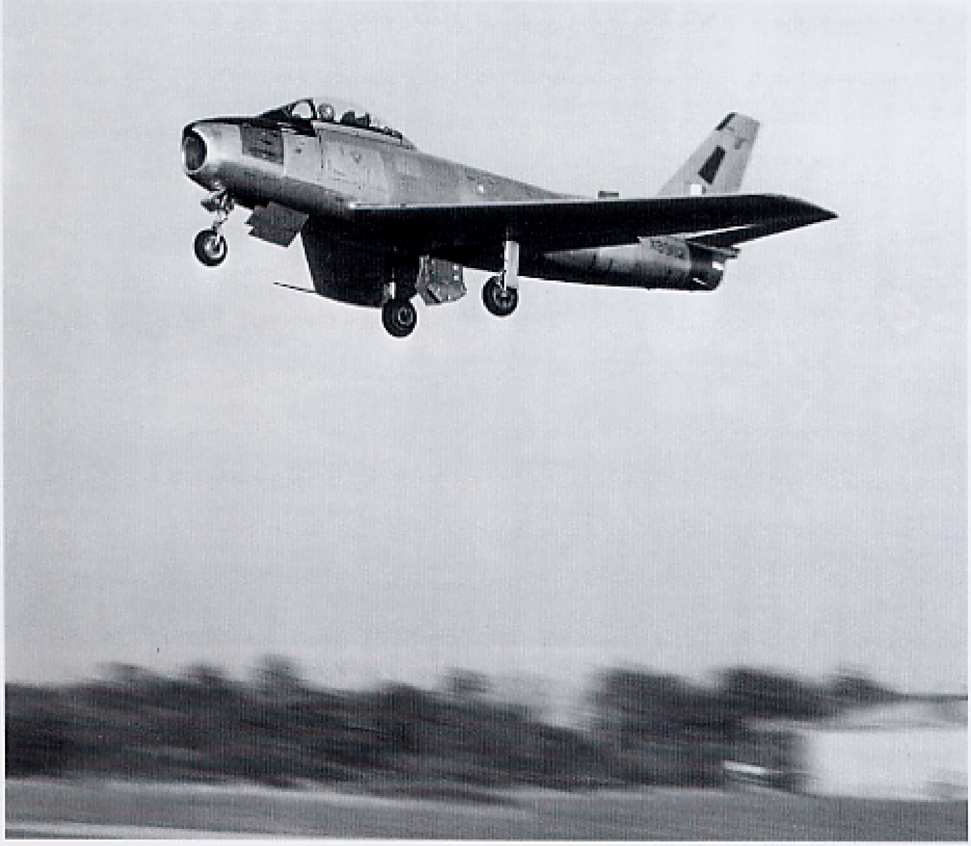
Consequently when hostilities ended the former Allies placed great store in collecting as much as possible to do with any aspect of the German jet aircraft programme. Both the USA and USSR saw such a prize as the means of making up for lost time since it was apparent that jet-powered flight was the way forward in aircraft design. Already a rivalry was developing between the two countries with each wanting to gain a lead over the other as a matter of national honour, then once the Iron Curtain descended and the Cold War began this rivalry became an arms race and a matter of national survival.

UNITED STATES' JET PROGRAMME

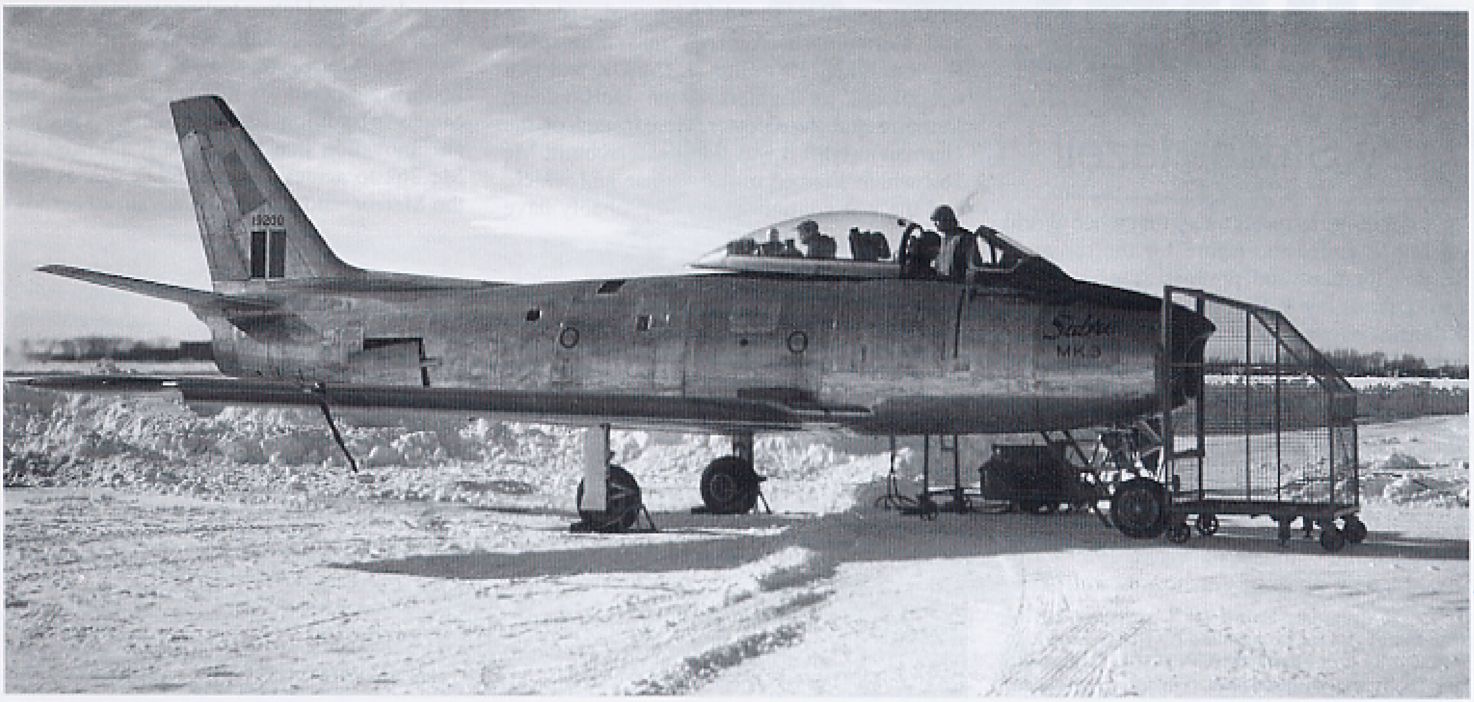
As early as the autumn of 1941, over a year before the USA entered the war, the British government had agreed to transfer highly classified gas turbine research data to the USA along with an example of Frank Whittle's early W.1 jet engine. There the General Electric Company built an American version of the engine for evaluation purposes, for installation in the XP-59, a specially designed airframe built by the Bell Aircraft Corporation. The General Electric Type I-A turbojet made its first test run on 18 March 1942 and on 1 October that year the prototype XP-59A Airacomet made its maiden flight at Muroc, California. From then until the end of hostilities General Electric worked to improve the engine's thrust, but an ever-growing number of problems occurred both with the engine and the airframe such that it soon became clear that the P-59 was never likely to become an operational fighter. The authorities therefore decided to use the type as a research and training aircraft only, and in 1943 Lockheed was invited to submit its design for an operational jet fighter, to be powered by another British engine, the



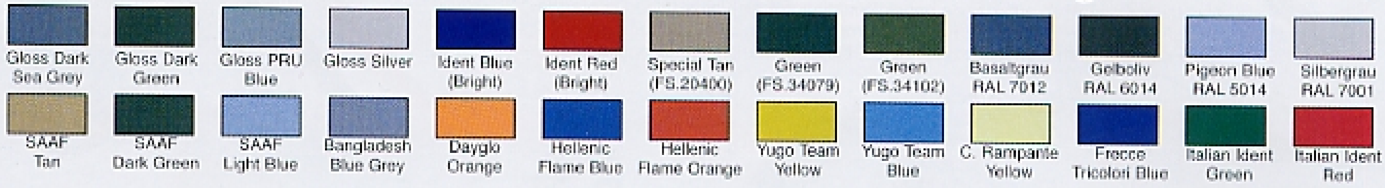
Above: The first Canadair Sabre Mk.2, 19102 first flew on 31 January 1951 piloted by Bill Longhurst. It is shown in the codes of 410 Squadron, RCAF. In 1954 it was exported to Greece where it was eventually lost on 29 August 1954. Below: Canadair Sabre Mk.4 19873, was delivered to the RAF as XB982 on 10 November 1953 where it served with No.92 Squadron. It was nominally transfered to the USAF but returned to British use with Bristol Siddeley as an Orpheus engine test bed until scrapped (Canadair)



The only Canadair Sabre Mk.3 (RCAF 19200) was powered by a 6,000 lbst thrust Orenda 3. It first flew on 14 June 1952 with a J-47 engine, made 12 flights then flew with the Orenda engine for the first time on 25 September 1952. It is seen at Cartierville during preliminary engine tests. (via Terry Panopalis)

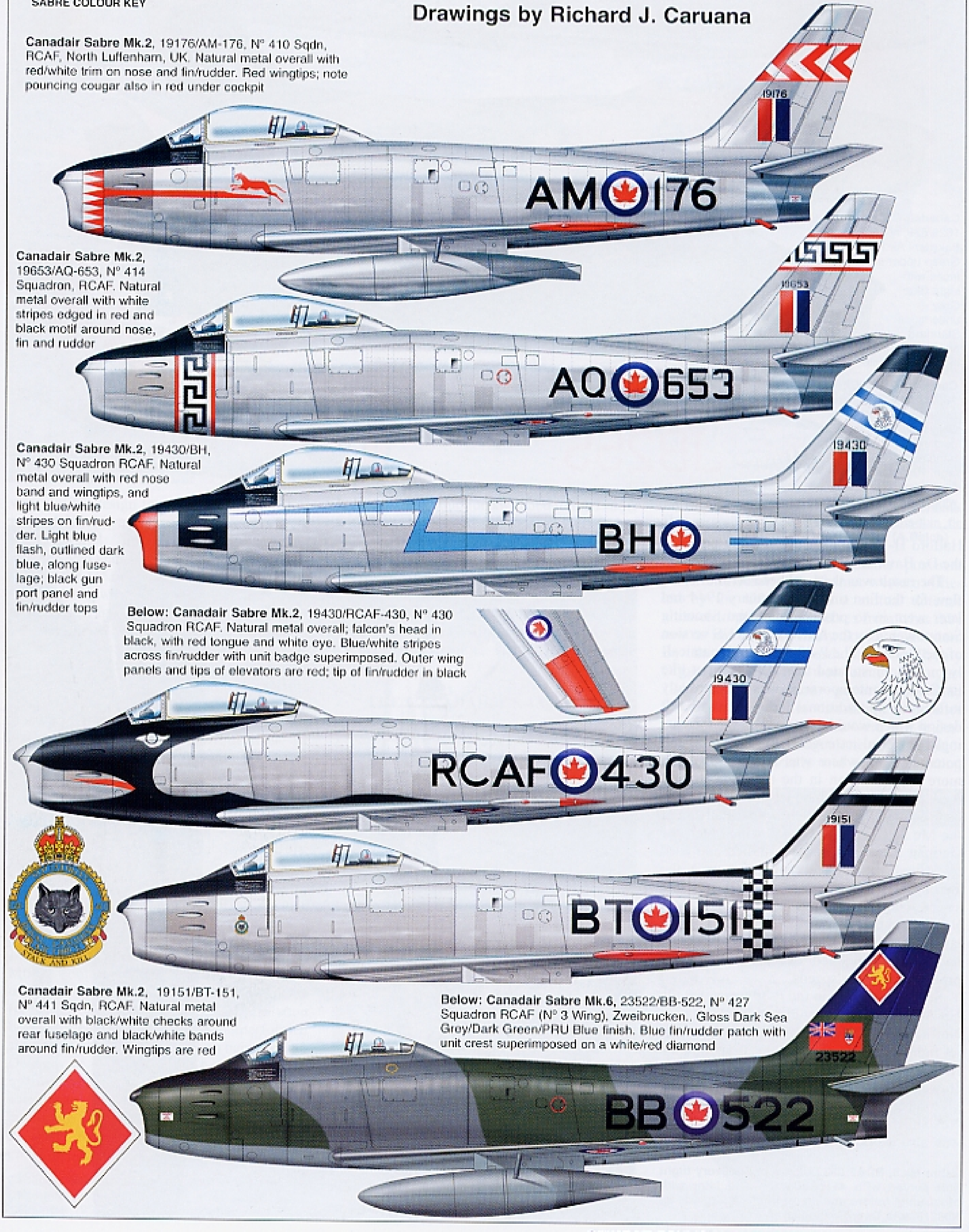


CL-13 and CA-27 Sabre camouflage and markings



SABRE COLOUR KEY

Drawings by Richard J. Caruana



Canadair Sabre Mk.2, 19176/AM-176, N° 410 Sqdn, RCAF, North Luffenham, UK. Natural metal overall with red/white trim on nose and fin/rudder. Red wingtips; note pouncing cougar also in red under cockpit

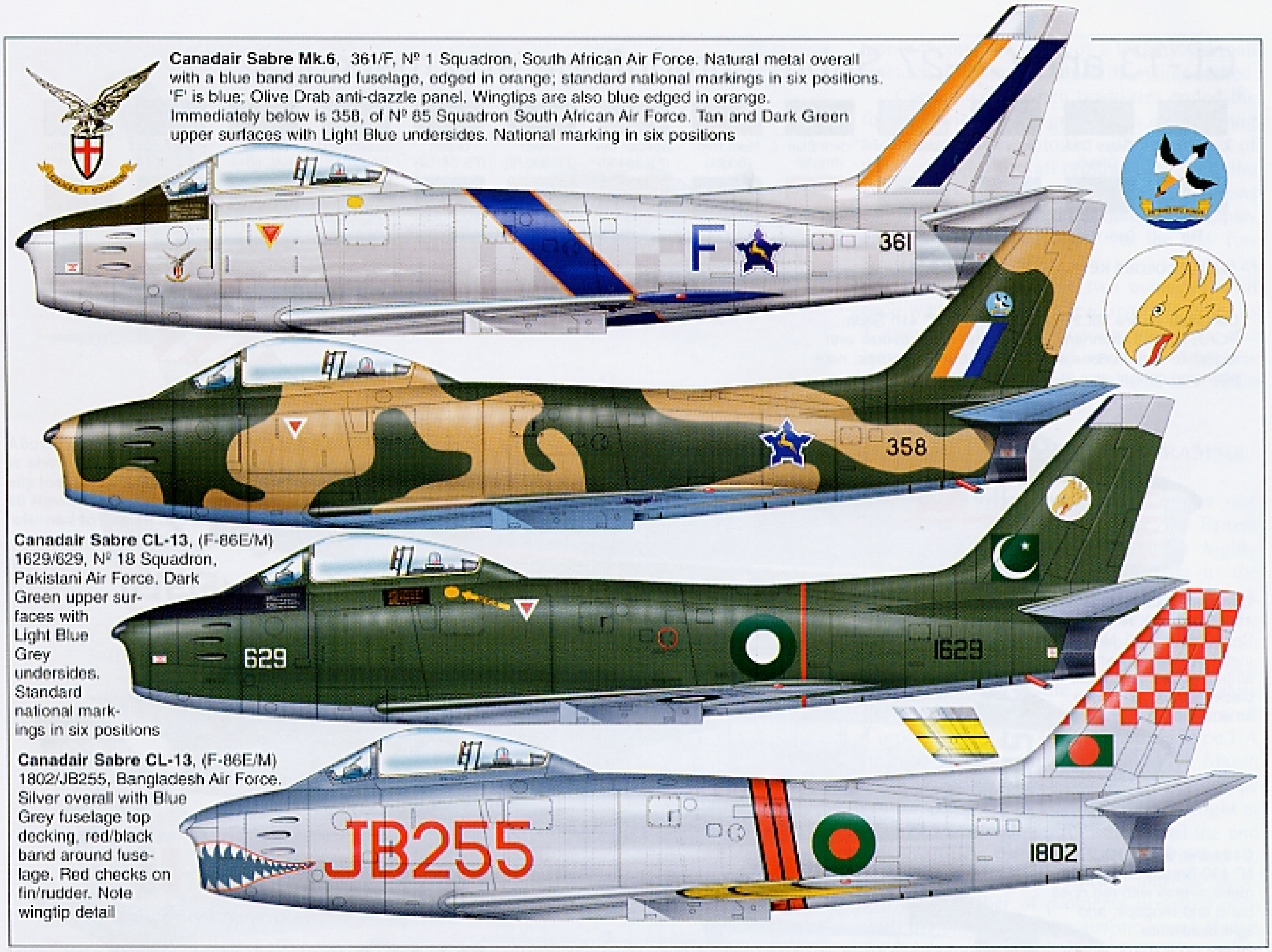
Canadair Sabre Mk.2, 19653/AQ-653, N° 414 Squadron, RCAF. Natural metal overall with white stripes edged in red and black motif around nose, fin and rudder

Canadair Sabre Mk.2, 19430/BH, N° 430 Squadron RCAF. Natural metal overall with red nose band and wingtips, and light blue/white stripes on fin/rudder. Light blue flash, outlined dark blue, along fuselage; black gun port panel and fin/rudder tops

Below: Canadair Sabre Mk.2, 19430/RCAF-430, N° 430 Squadron RCAF. Natural metal overall; falcon's head in black, with red tongue and white eye. Blue/white stripes across fin/rudder with unit badge superimposed. Outer wing panels and tips of elevators are red; tip of fin/rudder in black

Canadair Sabre Mk.2, 19151/BT-151, N° 441 Sqdn, RCAF. Natural metal overall with black/white checks around rear fuselage and black/white bands around fin/rudder. Wingtips are red

Below: Canadair Sabre Mk.6, 23522/BB-522, N° 427 Squadron RCAF (N° 3 Wing), Zweibrucken.. Gloss Dark Sea Grey/Dark Green/PRU Blue finish. Blue fin/rudder patch with unit crest superimposed on a white/red diamond



Canadair Sabre Mk.6, 361/F, Nº 1 Squadron, South African Air Force. Natural metal overall with a blue band around fuselage, edged in orange; standard national markings in six positions. 'F' is blue; Olive Drab anti-dazzle panel. Wingtips are also blue edged in orange. Immediately below is 358, of Nº 85 Squadron South African Air Force. Tan and Dark Green upper surfaces with Light Blue undersides. National marking in six positions

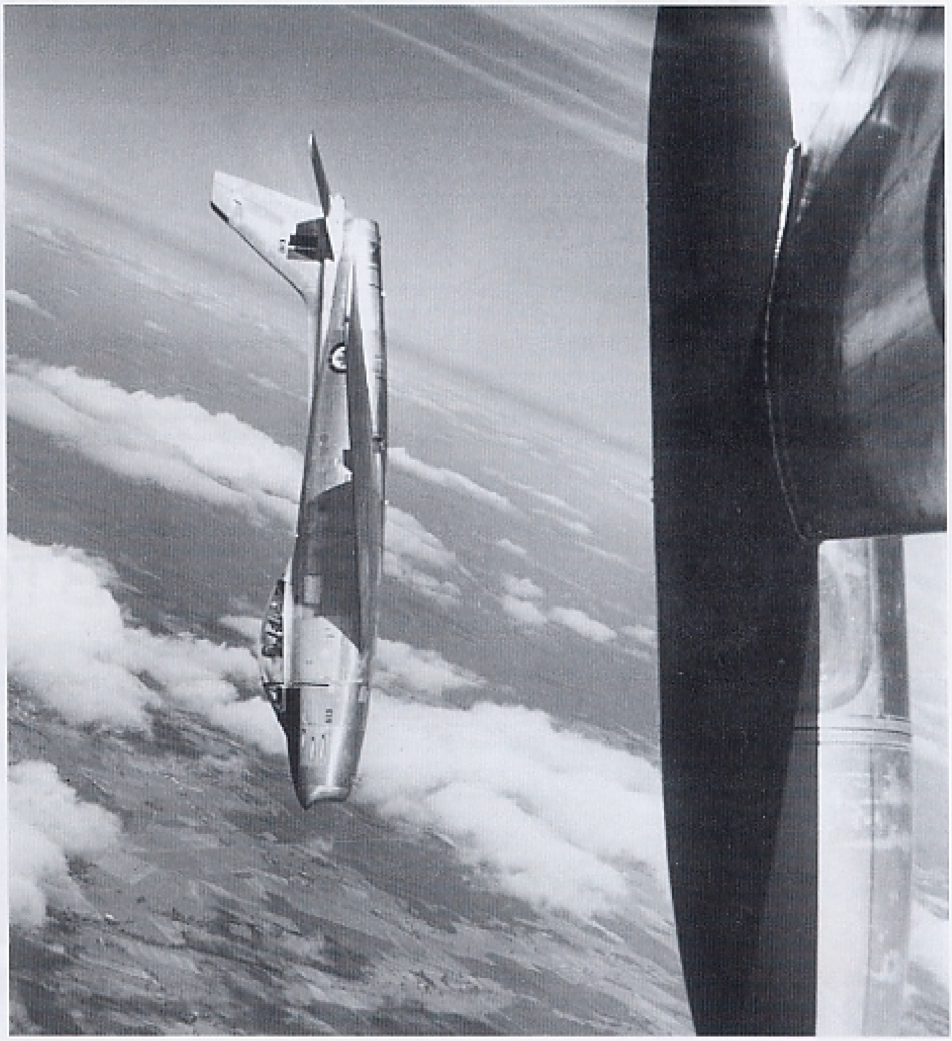
Canadair Sabre CL-13, (F-86E/M) 1629/629, Nº 18 Squadron, Pakistani Air Force. Dark Green upper surfaces with Light Blue Grey undersides. Standard national markings in six positions

Canadair Sabre CL-13, (F-86E/M) 1802/JB255, Bangladesh Air Force. Silver overall with Blue Grey fuselage top decking, red/black band around fuselage. Red checks on fin/rudder. Note wingtip detail

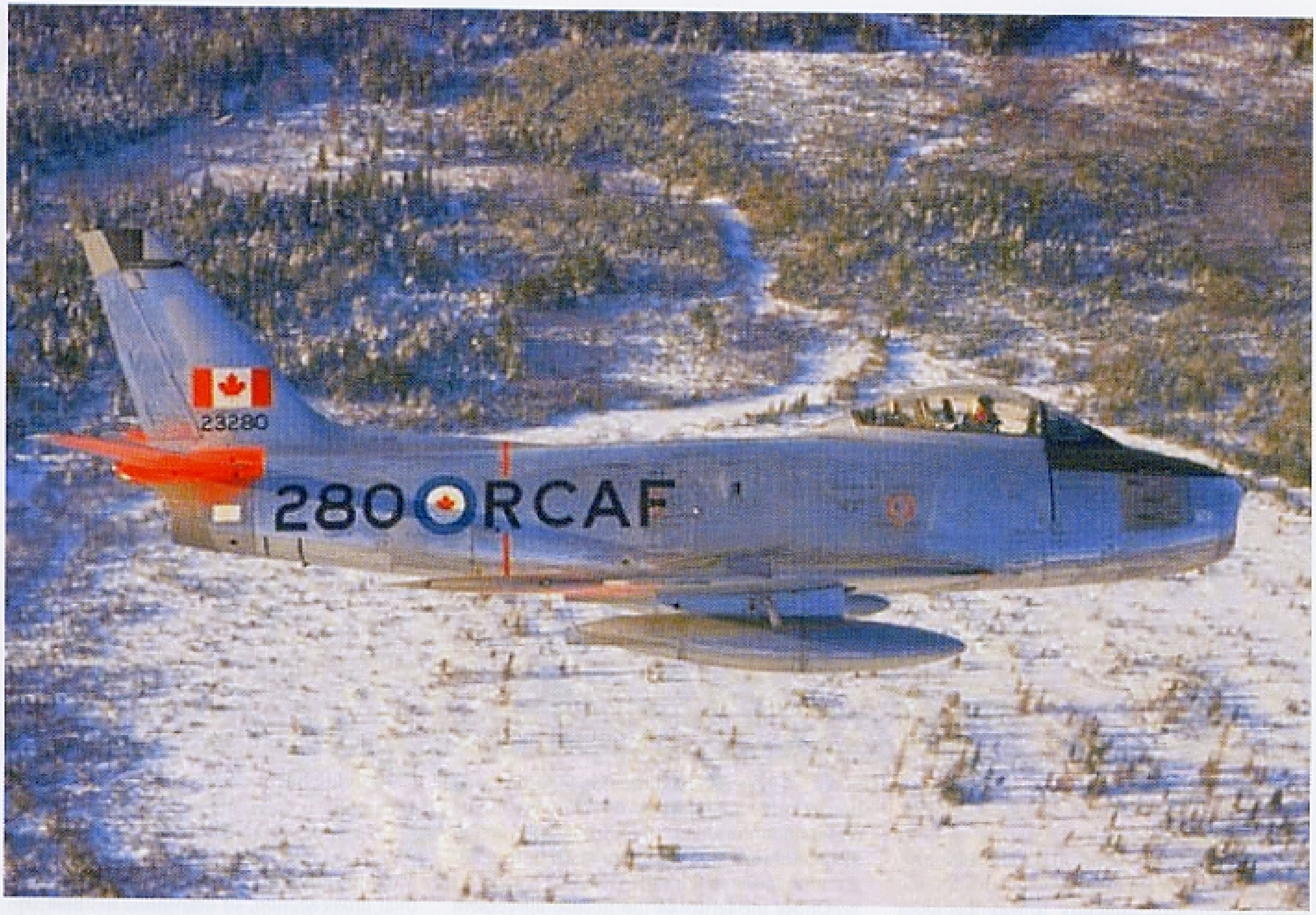
Halford H-1 Goblin, which already powered the De Havilland Vampire.

The result was the Lockheed XP-80 which flew for the first time on 8 January 1944 and later went in to production as the Shooting Star powered by the Allison J33, a US version of the Goblin. The P-80 was aerodynamically more sophisticated than the P-59 but like its British contemporaries was still strongly influenced by traditional ideas about aircraft design which would never permit the increasingly powerful jet engines to reach their full potential. Nowhere was this conservatism more apparent than in the aircrafts' straight wing planform, which on jet-powered aircraft had been rendered obsolete with the advent of the Me 262 hence the speed with which the German research data was studied and used by Allied aeronautical engineers once the European war had ended. Ironically the swept wing had already been tried in both Britain and the USA on aircraft with a canard layout such as the Curtiss-Wright XP-55, but had been abandoned because of stability problems at lower speeds.

Soon after work on the P-80 began for the US Army the US Navy placed an order with North American for the FJ-1, a single-engined jet fighter capable of operating from US carriers in the Pacific war against Japan. However, the war had ended by the time the prototype XFJ-1 made its first flight on 27 November 1946, and by then North American was also working on three prototypes of a



Sabre Mk.5, RCAF 23323, on a pre-delivery flight first served with 441 Squadron and later with other units before ending up in civilian hands as N98279. (via Terry Panopalis)



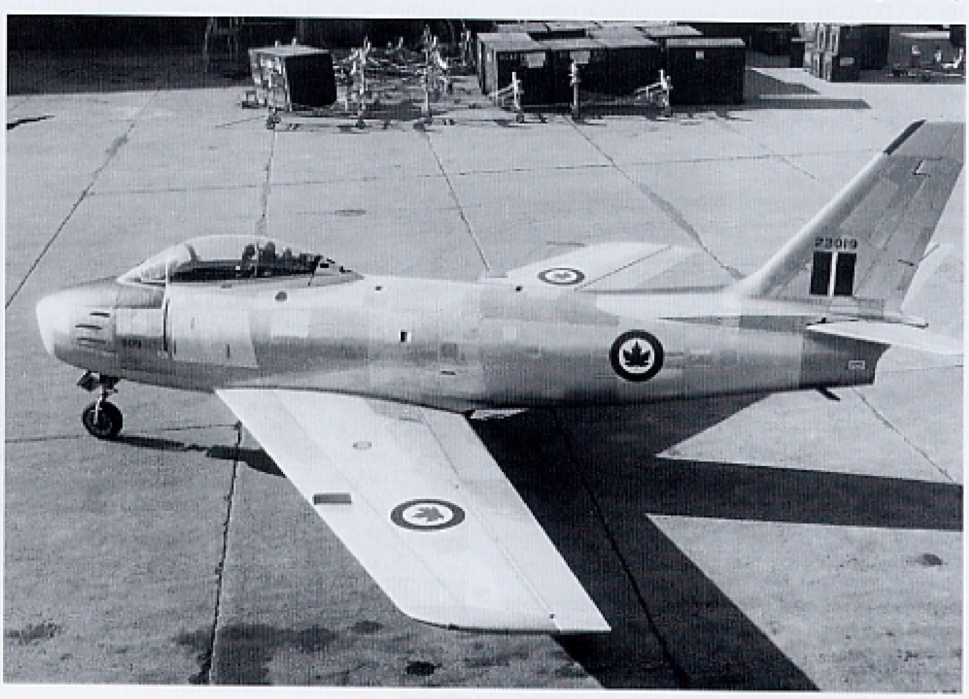
An RCAF Sabre in its all silver colour scheme. This aircraft has the present day Canadian fin flash and may therefore be a warbird (A.Balch)

very similar design for the US Air Force designated XP-86, and these two projects were run in parallel. Both were to be powered by an improved version of the Whittle axial-flow engine, the J35, and initially both had straight wings. However, wind tunnel tests later showed that in this configuration the XP-86 would not achieve the required top speed of 600 mph (521 knots or 965 km/h) and would be out-performed by its rival, the Republic XP-84. Accordingly a swept wing version based upon a German wing design once considered for the Me 262 was proposed, and this revised design was accepted in principle by the USAF on 1 November 1945. Following satisfactory wind tunnel tests and design evaluation the USAF gave approval on 28 February 1946 for the proposed XP-86 prototypes to be built to the swept wing and tail design, thereby fixing the basic layout of the F-86 Sabre.

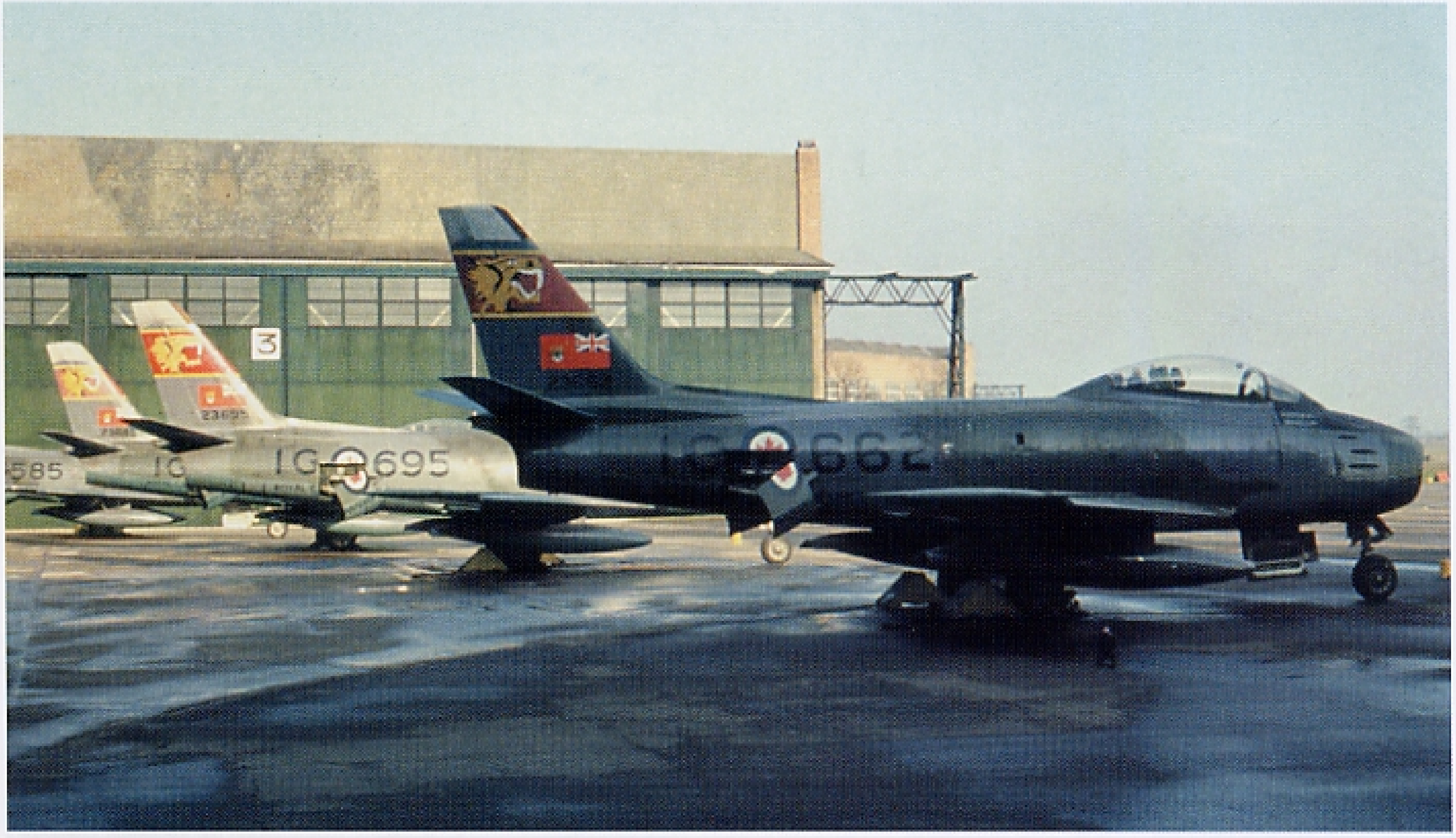
Even before the first prototype was completed an order had been placed for 33 production P-86As powered by the improved General Electric J47 engine, and on 1 October 1947 the first XP-86 made its maiden flight at Muroc. Following brief manufacturer's trials the prototype was handed over to the USAF for initial service evaluation and it soon became clear that the XP-86 outperformed any of the other jet fighters then being tested. Delivery of production F-86As as they were by then designated, began to USAF fighter squadrons in February 1949, the month before the name Sabre was formally adopted, and thereafter contracts were placed for progressively improved versions of the aircraft. In late 1950 production switched to the F-86E with power-operated ailerons and all-flying tailplane which greatly improved handling and manoeuvrability at high sub-sonic speeds. From March 1952 the more powerful F-86F began to appear with the original J47-GE-13 engine replaced by the J47-GE-27 version, and this was followed in 1953 by the F-86H fighter-bomber version of the basic Sabre design.

THE CANADAIR CL-13 SABRE

From 1945 the USSR adopted a more aggressive foreign policy with international tension mounting during the immediate post-war years until some of the former western Allies led by the USA formed a mutual defence alliance to protect themselves from what they saw as increasingly likely Soviet aggression. By the time the North Atlantic Treaty Organisation (NATO) was formed in August 1949 many western governments had reversed their earlier disarmament policies but most of their economies were still in desperate straits. The USA alone remained economically, industrially and militarily strong



Canadair Sabre Mk.5 RCAF 23019, seen at the Canadair factory before its first flight on 6 November 1953. (via Terry Panopalis)



Four Canadair Sabres of 439 Squadron RCAF on a goodwill visit to RAF Waddington in October 1959 (Adrian Balch)

and there it took little effort to reinstate production of all manner of armaments for the Cold War. Consequently it was the USA which became the main arms supplier to NATO's fledgling forces which were being established to counter the growing Soviet threat.

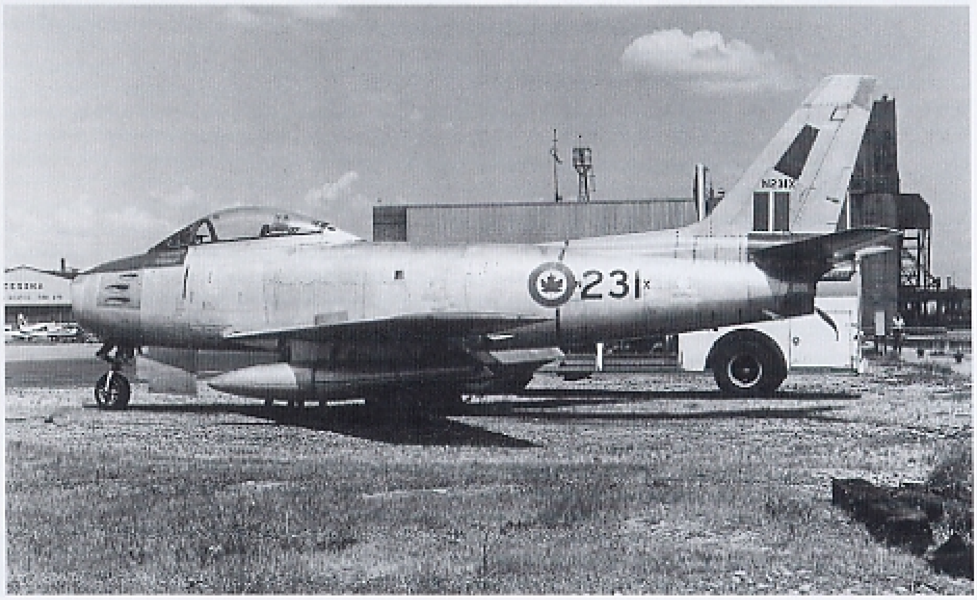
Some member states such as the UK and France had a domestic aviation industry which in theory could produce the types of aircraft needed, even if not immediately. Canada on the other hand had experience of building aircraft, generally to foreign designs, but had not been involved in jet engine production or research in high-speed flight. Paradoxically this proved an advantage because once the Canadian government had decided to acquire jet fighters in order to meet its NATO commitment to provide a permanent fighter force in Europe, it was simply a matter of evaluating the types available in the west and buying the most suitable. It was clear that swept wing fighters promised most in terms of high speed performance so the choice was between the F-86 Sabre, which had already flown, and the Hawker Hunter which had not, and an offer of favourable terms for licensed production helped secure Canada's selection of the Sabre.

Since the Sabre was to be the standard day fighter of the Royal Canadian Air Force (RCAF) for deployment to Europe as well as for training jet fighter pilots at home, large numbers would be needed. Accordingly licensed production by Canadair Ltd at Cartierville, near Montreal, was planned, and in August 1949 an agreement to that effect was signed between North American and Canadair involving an initial batch of 100 F-86As. These received the Canadair designation CL-13 Sabre Mark 1 and were to be based upon the standard F-86A-5-NA version of the Sabre which was then starting to enter squadron service with the USAF.

Under the terms of the license agreement which theoretically covered all versions of the F-86, about 90 per cent of the airframe sub assemblies and components were initially to be supplied to Canadair, together with the General Electric J47-GE-13 engines, for final assembly at Cartierville. Production drawings were also to be sent to Canadair, together with engineers and specialist advisers so that the Canadians could gradually take on more of the actual manufacture of assemblies over the years, and it was intended that eventually a production rate of two aircraft a month would be achieved. By the time the programme finished in 1958 Canadair was building some 85 percent of the airframe together with all of the power plant, and by then the aeroplane was significantly different from that which had first rolled off the Cartierville line in 1950.

CANADA'S SABRES

The Sabre fuselage was essentially a tube of oval cross section, of conventional flush-riveted, metal stressed-skin construction. The engine's air intake was positioned at the front with a fibreglass intake ring, and the exhaust was at the rear end where stainless steel was used in the fuselage construction because of the high jet pipe temperatures involved. The J47 engine was located aft of the cockpit buried within the fuselage which was itself built in two sections with the joint line at the wing trailing edge. This permitted the rear fuselage to be removed for access to the jet pipe and to facilitate engine changes. Engine starting was done electrically using an external power source which plugged into a socket in the port fuselage above the wing trailing edge. Located low on either side of the rear fuselage were large air brakes which opened out and downwards on hydraulic jacks and



Still in its RCAF national markings and codes this Sabre Mk.5 has a small civil registration on the fin N231X. It was later overhauled and used by Flight Systems Inc as N91FS. (APN)

Canadair CL-13 Sabre production list

Type	Serial numbers	Numbers built	Construction numbers
CL-13 Mk.1	191010, later 19101	1	1
CL-13 Mk.2	19102 to 19199 19201 to 19452	350	2 to 99 101 to 352
CL-13 Mk.3	1	1	19200
CL-13 Mk.4	19453 to 19890	438	353 to 790
CL-13A Mk.5	23001 to 23370	370	791 to 1160
CL-13B Mk.6	23371 to 23760	390	1161 to 1590
CL-13B Mk.6	2021 to 2026 (Colombia)	6*	
CL-13B Mk.6	350 to 383 (South Africa)	34*	
CL-13B Mk.6	6030 to 6037 (Israel)	8+	
CL-13B Mk.6	S6-1591 to 1815 (Federal Germany)	225	1591 to1815

* Colombian and South African aircraft drawn from RCAF Mk.6 production.

+ 8 aircraft completed from cancelled Israeli order and taken over by RCAF.

could be operated at any airspeed.

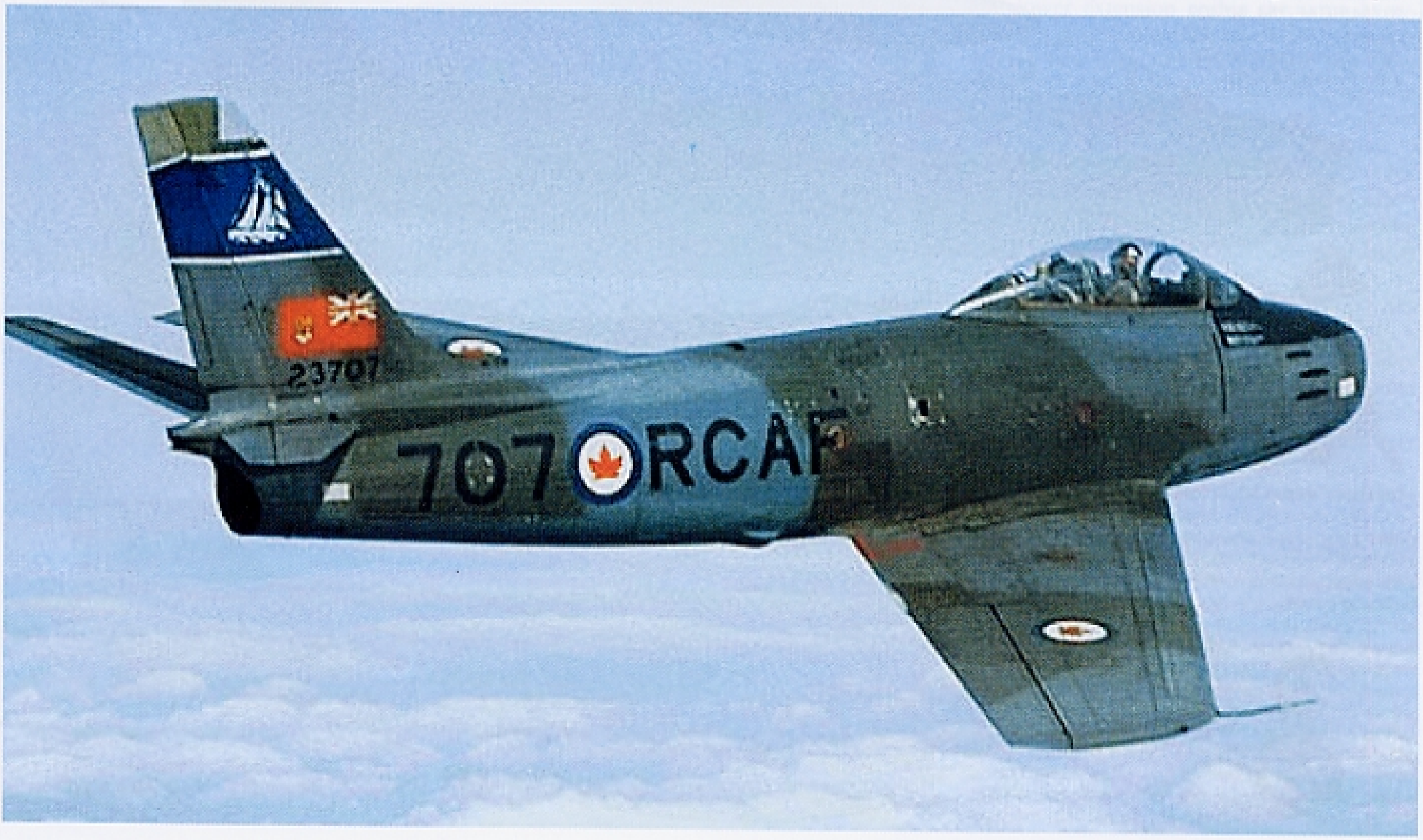
The tricycle undercarriage, also hydraulically operated, had an aft-retracting nose wheel with a small front door covering the operating mechanism and a single large nose wheel door hinged on the port side which was sequenced electrically to open only during movements of the nose oleo. This large door was necessary because the nose wheel rotated through 90 degrees during retraction to lie flat within the bottom of the fuselage below the air intake trunking. Once on the ground however, the door opened to permit access to the wheel bay. The nose wheel had hydraulic steering which, when selected, was controlled by rudder bar movement, and main wheel braking was achieved using brake pedals attached to the rudder bar. The main undercarriage legs retracted inwards below each wing root and carried a fixed door on each outer face, whilst separate doors hinged below the centre fuselage covered each wheel well. It was necessary that the retracted wheels were housed in the fuselage underside because the wing thickness was too narrow to accommodate the size of the main wheel tyres, hence the narrow track of the Sabre's main undercarriage. In the event of hydraulic failure the main wheels could be lowered by gravity whilst the nose wheel was extended using pressure from its own single-shot hydraulic accumulator.

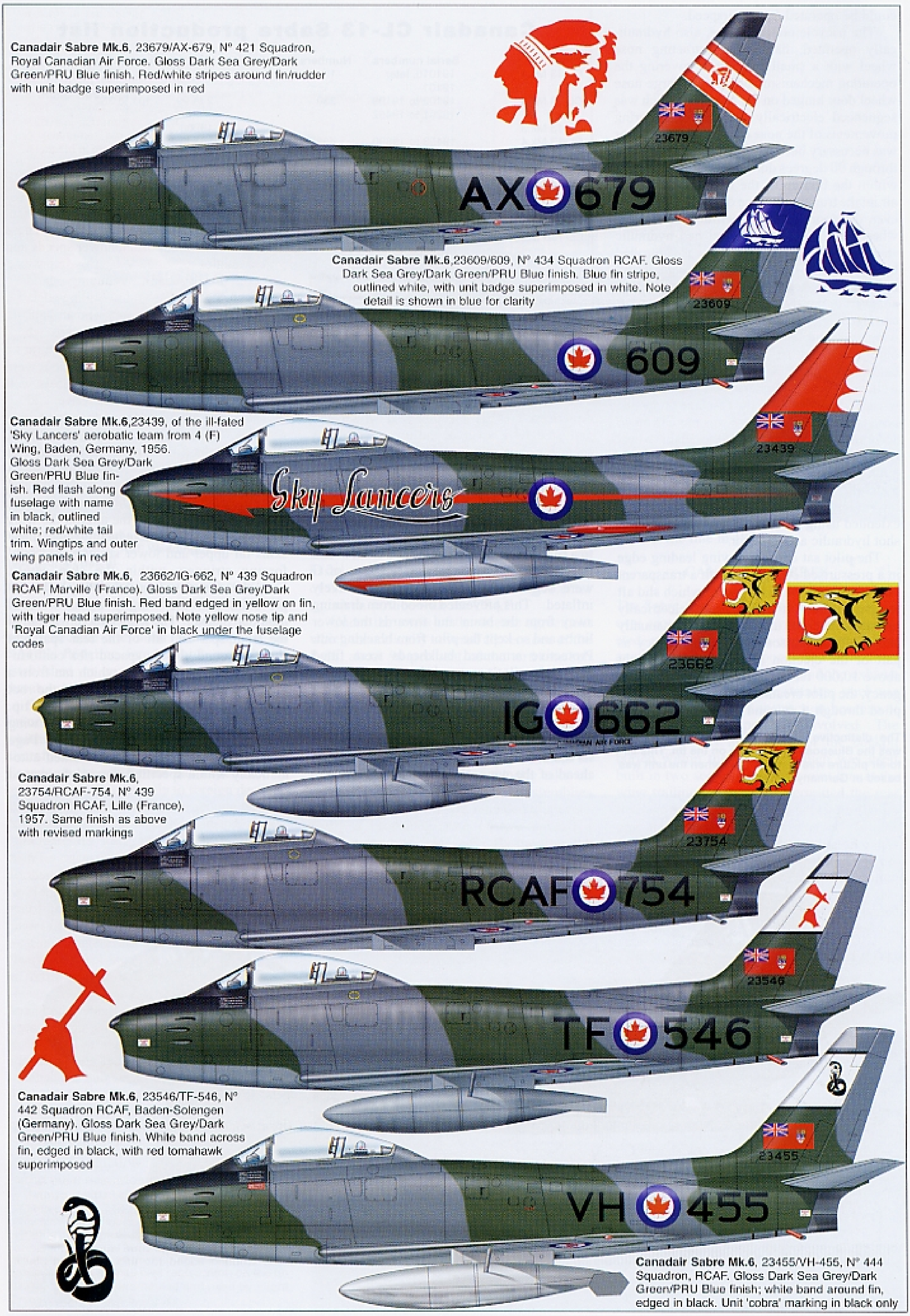
The pilot sat above the wing leading edge in a pressurised cockpit beneath a transparent bubble canopy, the main part of which slid aft to give access. It was normally electrically operated but could also be operated manually and could be jettisoned in an emergency as part of the ejection sequence. For flight above 10,000 feet (3,048 m) and in an emergency, the pilot breathed gaseous oxygen supplied through a demand regulator unit from four oxygen bottles located in the nose wheel bay, two either side of the undercarriage leg. The pilot was provided with a North American T-14E-1 ejection seat which was activated by a lever in the arm rests rather than by seat-pan and face-blind handles which later became the norm.

Another innovation was provision for a G-suit to improve the pilot's G-tolerance during manoeuvres. Pressurised air drawn from the engine's eighth-stage compressor was piped to a rubber suit worn over the lower torso and upper legs, and as increasing amounts of G were registered so the suit progressively inflated. This prevented blood from draining away from the brain and towards the lower limbs and so kept the pilot from blacking out. Protective armoured bulkheads were fitted behind the pilot's seat and ahead of the instrument panel, and the fixed windscreen area was made of armoured glass. Access to the cockpit was by way of the large drop-panel covering the ammunition bay which also served as a step, set low on the port fuselage ahead of the wing, then by a series of kick-steps up the fuselage side. Further steps were positioned on the starboard fuselage as well primarily for use by the ground crew.

The wings were low set and made in three sections, a central carry-through section which contained a part of the forward fuel tank, and two swept mainplane panels. Because the wings were made as thin as possible to reduce drag they were strongly constructed. Out almost to the aileron the wing had two spars with double heavy-gauge metal skins on upper and lower surfaces and reinforcing stringers within the skin cavity. From the aileron outboard the wing had a single skin, and the wingtip cones were of moulded plastic. The wing structure ahead of the front spar and aft of the rear spar was shaped around closely spaced ribs conforming to the aerofoil section, which ran from a modified NACA 0012-64 section at the root to a NACA 0011-64 section at the tip. Almost the whole wing outboard of the wing root walk way was fitted with Handley Page type leading edge slats which worked automatically within specified ranges of airspeed

The distinctive feature of RCAF Squadron 434 was the Bluenose sailing ship on the fin. This air-to-air picture was taken in 1960 when the unit was based in Germany. (Adrian Balch)





Canadair Sabre Mk.6, 23679/AX-679, Nº 421 Squadron, Royal Canadian Air Force. Gloss Dark Sea Grey/Dark Green/PRU Blue finish. Red/white stripes around fin/rudder with unit badge superimposed in red

Canadair Sabre Mk.6,23609/609, Nº 434 Squadron RCAF. Gloss Dark Sea Grey/Dark Green/PRU Blue finish. Blue fin stripe, outlined white, with unit badge superimposed in white. Note detail is shown in blue for clarity

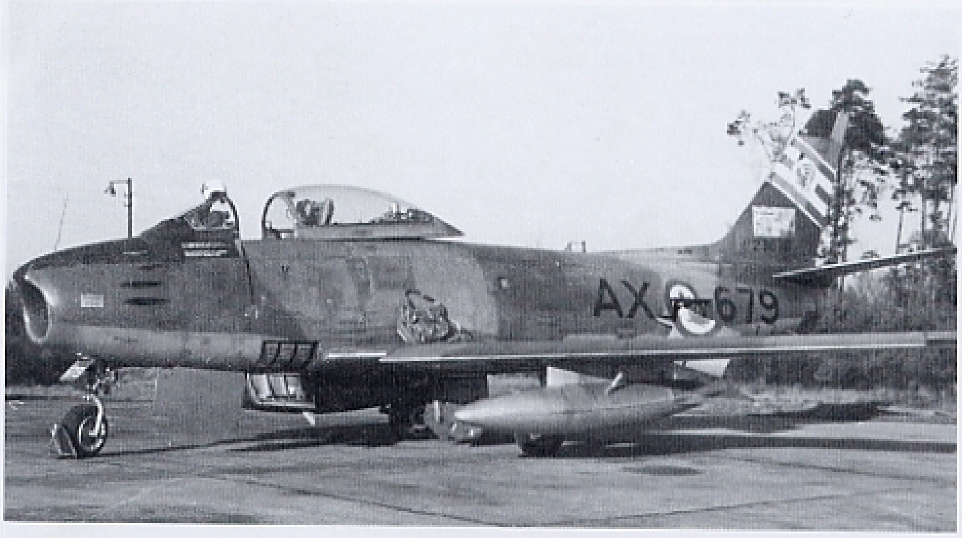
Canadair Sabre Mk.6,23439, of the ill-fated 'Sky Lancers' aerobatic team from 4 (F) Wing, Baden, Germany, 1956. Gloss Dark Sea Grey/Dark Green/PRU Blue finish. Red flash along fuselage with name in black, outlined white; red/white tail trim. Wingtips and outer wing panels in red

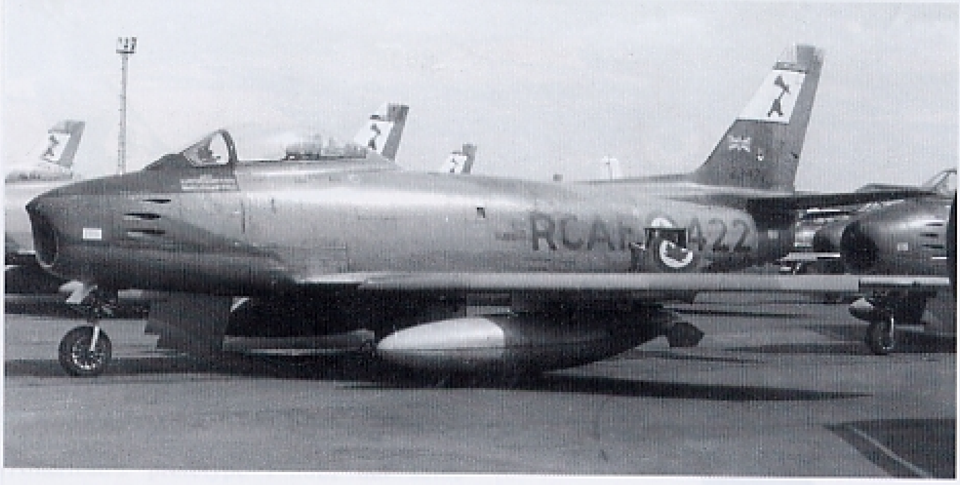
Canadair Sabre Mk.6, 23662/IG-662, Nº 439 Squadron RCAF, Marville (France). Gloss Dark Sea Grey/Dark Green/PRU Blue finish. Red band edged in yellow on fin, with tiger head superimposed. Note yellow nose tip and 'Royal Canadian Air Force' in black under the fuselage codes

Canadair Sabre Mk.6, 23754/RCAF-754, Nº 439 Squadron RCAF, Lille (France), 1957. Same finish as above with revised markings

Canadair Sabre Mk.6, 23546/TF-546, Nº 442 Squadron RCAF, Baden-Solengen (Germany). Gloss Dark Sea Grey/Dark Green/PRU Blue finish. White band across fin, edged in black, with red tomahawk superimposed

Canadair Sabre Mk.6, 23455/VH-455, Nº 444 Squadron, RCAF. Gloss Dark Sea Grey/Dark Green/PRU Blue finish; white band around fin, edged in black. Unit 'cobra' marking in black only





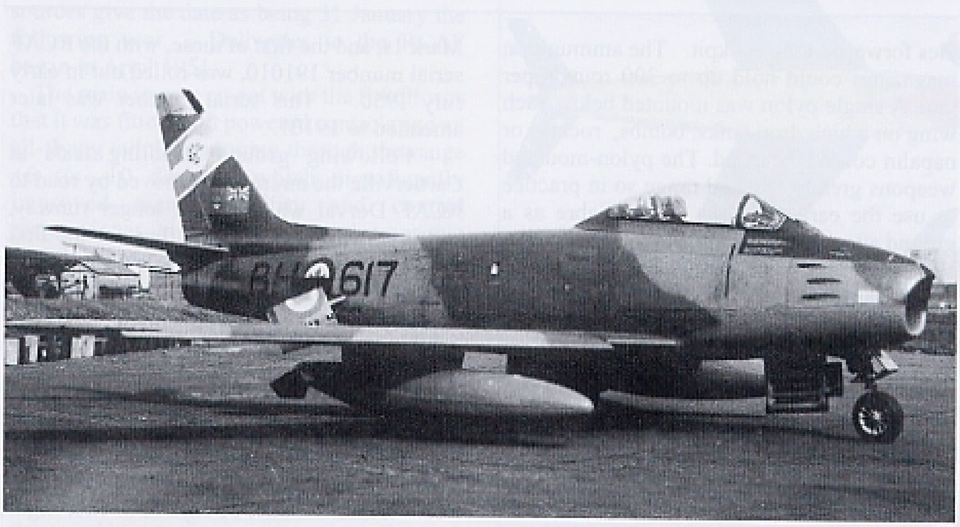
Left: One of the Sabre squadrons in No.2 Wing was 421 shown here by Mk.6 23679. This carries a red and white tail band with a coloured Indian Chief's head on a white disc and also has a red nose wheel front door with the last three figures of the serial number repeated on it in white. (MAP) Lower left: A 422 Squadron Sabre Mk.6 RCAF 422 at the Scottish Aviation factory, Prestwick after withdrawal from use in 1963. The fin marking consists of a red tomahawk on a white panel edged top and bottom in black. (APN)

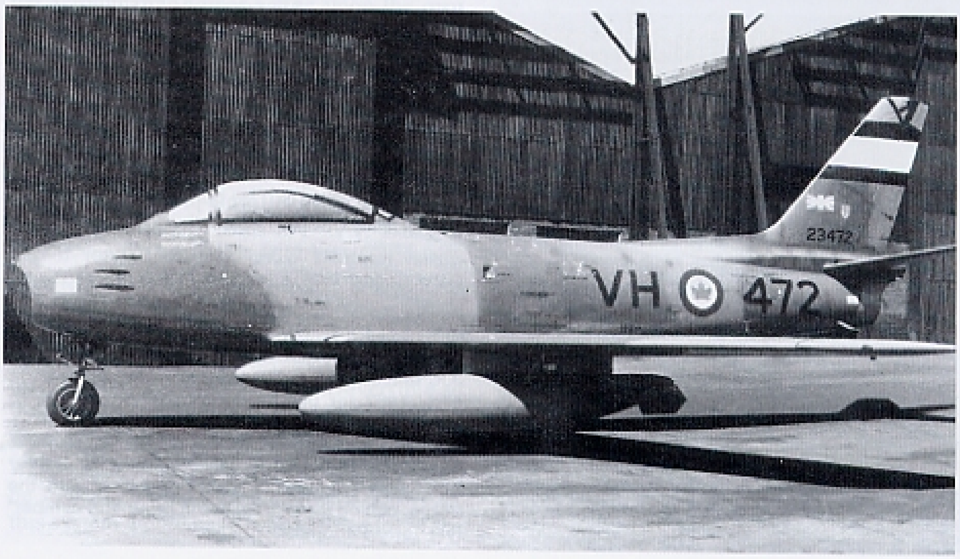
and angle of attack. To take account of wing flexing each slat, although it operated as a single unit, was made up of four separate sections with loosely articulated joints. These slats gave additional lift at slower speeds and higher angles of attack thereby improving manoeuvrability and reducing landing approach speed. Each wing trailing edge out as far as the aileron, rather less than half the span, carried one-piece slotted flaps which could be lowered electrically through a range of 38 degrees.

Not only the Sabre's wings but also the tailplane and the fin were highly swept, all at the same 35 degree leading edge sweep angle, with the tailplanes set at a 10 degree dihedral angle. All the tail surfaces were of stressed skin, metal construction over conventional spars and ribs. The tailplane was of the all-moving type to allow the pilot to wind in trim adjustments between +1 degree to −10 degrees, whilst the manually controlled elevators were specially geared to compensate for the tailplane movement. The rudder on the other hand had a conventional, manually adjustable trim tab.

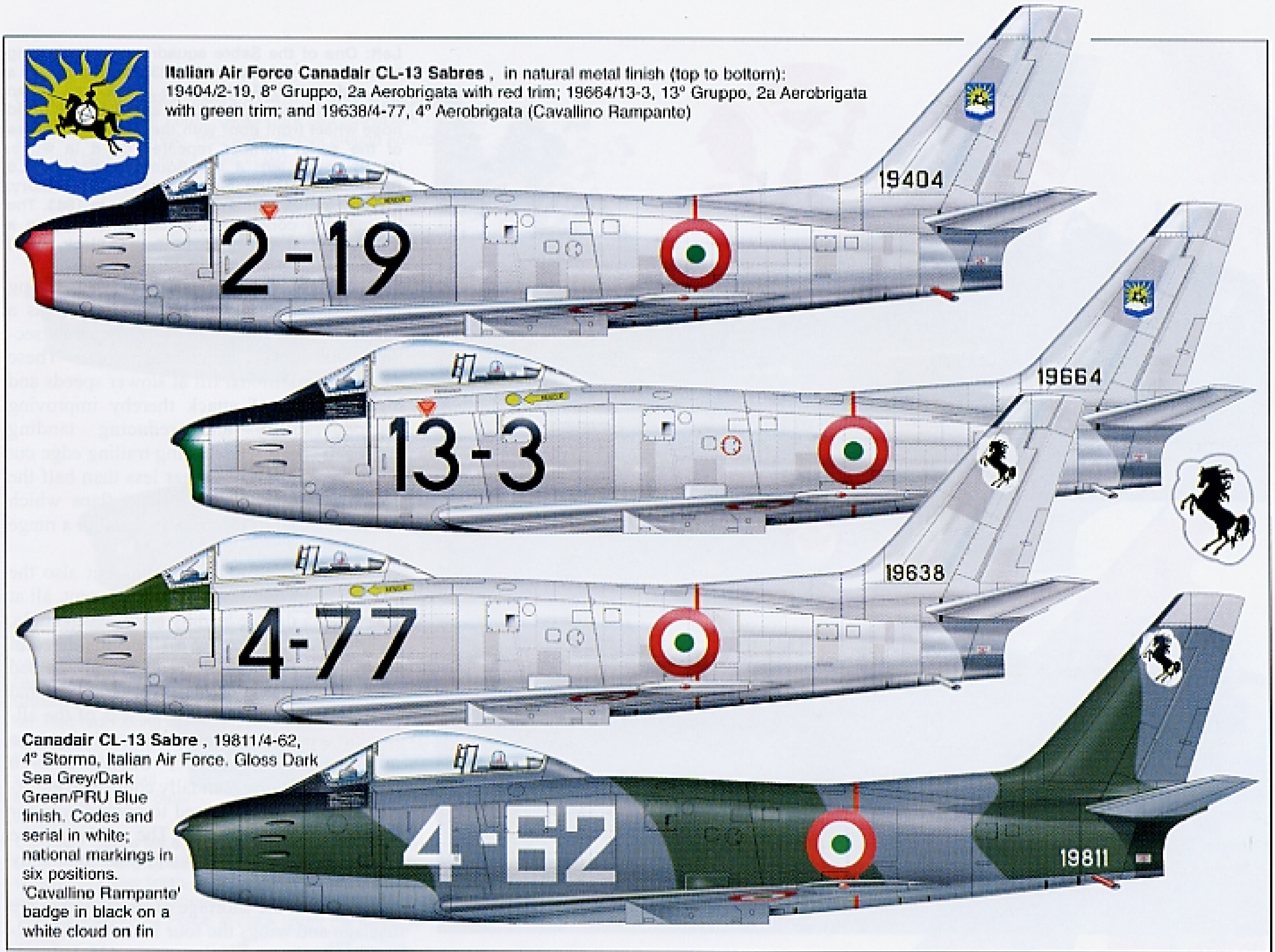
Because of the shortage of space within the fuselage and wings the four internal self-sealing fuel tanks containing some 435 US gallons (348 imp. gal/1,582 litres) of useable fuel were grouped around the underside of the centre fuselage and in the wing roots, all filled through gravity refuelling points. The front tank between the wings contained 196 US gallons and was shaped to surround the lower part of the main intake trunking with a flat lower extension within the wing carry-through structure. The rear tank below the engine bay held 105 US gallons, and there was a 67 US gallon tank in each wing root located between the two wing spars. From the beginning the aircraft was designed to carry additional fuel in two pylon-mounted 120 US gallon (100 imp. gal/454 litre) external drop tanks, one beneath each wing, with alternative provision for the carriage of larger 206 US gallon (165 imp. gal/750 litre) ferry tanks instead. The fuel from these drop tanks fed into the front fuselage tank.

Being designed as a day fighter, the Sabre was expected to operate either under radar control from ground stations or in formations which would patrol designated areas and rely upon visual contact to locate and engage targets. It was equipped with a single AN/ARC-





Upper left: No.2 Wing adopted a sloping tail band for its 430 Squadron's markings. Here 23617, a Sabre Mk.6, has a light blue and white band with a falcon's head denoting 430 Squadron stencilled in black on a white disc. Note that there is the 'Royal Canadian Air Force' title in black below the fuselage roundel. (MAP) Left: 444 Squadron Sabre Mk.6 23472 in open storage at Prestwick wearing an early version of the squadron's markings with black fuselage code letters and a broad white tailband edged top and bottom in black. Later the tail band was limited to the fin only with thinner black edging and with the unit's cobra emblem marked on the band also in black (MAP)



Italian Air Force Canadair CL-13 Sabres, in natural metal finish (top to bottom): 19404/2-19, 8° Gruppo, 2a Aerobrigata with red trim; 19664/13-3, 13° Gruppo, 2a Aerobrigata with green trim; and 19638/4-77, 4° Aerobrigata (Cavallino Rampante)

Canadair CL-13 Sabre, 19811/4-62, 4° Stormo, Italian Air Force. Gloss Dark Sea Grey/Dark Green/PRU Blue finish. Codes and serial in white; national markings in six positions. 'Cavallino Rampante' badge in black on a white cloud on fin

3 VHF radio for voice communications and an AN/APX-6 Identification Friend or Foe (IFF) transponder which generated a radar response when triggered to identify the aircraft as a 'friendly' contact. The IFF aerial was mounted in a dielectric fairing at the fin tip. The only navigation aid carried was an AN/ARN-6 radio compass which gave the pilot a bearing from a selected ground transmitter beacon, with the receiving aerials being mounted behind the pilot's seat under the canopy and also within the laminations of the canopy roof.

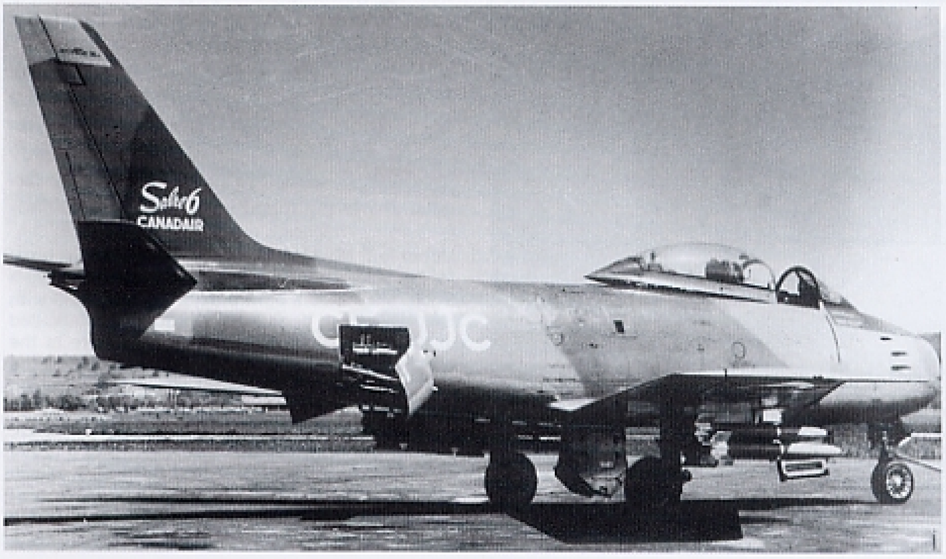
Main armament of the Sabre consisted of six 0.5 inch (12.75 mm) M-3 machine guns mounted fully recessed, three each side of the cockpit in heated gun bays, with the gun muzzles forward of the cockpit. The ammunition magazines could hold up to 300 rounds per gun. A single pylon was mounted below each wing on which drop tanks, bombs, rockets or napalm could be carried. The pylon-mounted weapons greatly reduced range so in practice to use the early versions of the Sabre as a ground attack aircraft was seldom practicable. With drop tanks fitted the Sabre's maximum speed was effectively limited to around Mach 0.97.

MODIFIED PLANS

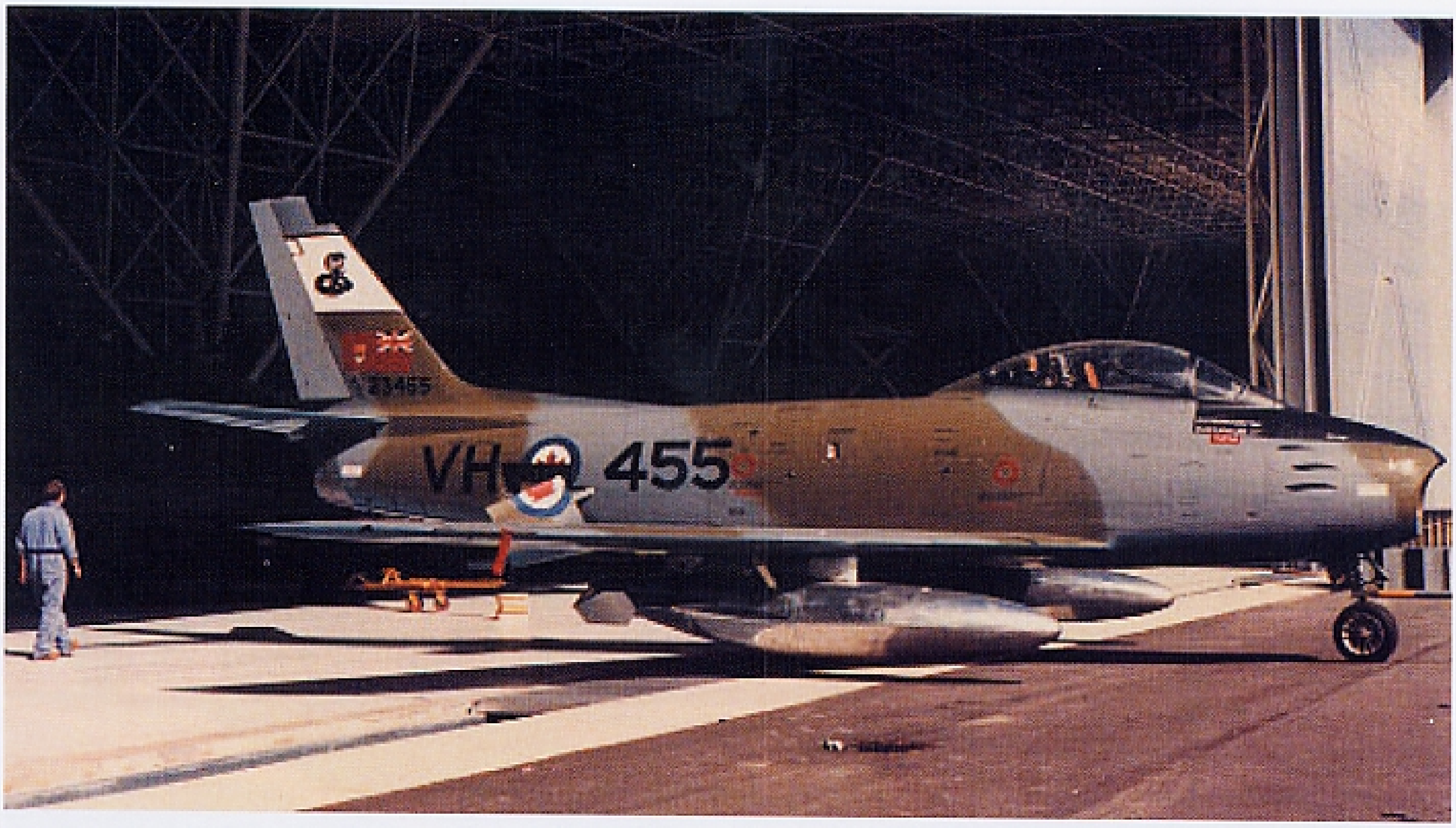
As called for under the original production order, the first Canadair CL-13 Sabres to be laid down at Cartierville were to be Sabre Mark 1s, and the first of these, with the RCAF serial number 191010, was rolled out in early July 1950. This serial number was later amended to 19101.

Following ground handling tests at Cartierville the aircraft was moved by road to RCAF Dorval which had a longer runway, and it was from here that it flew for the first time on 9 August with Canadair's Chief Test Pilot A. J Lilly at the controls. By then work was already in hand to lengthen the main runway at Cartierville so that future jet operations could safely be undertaken from there. Because the Sabre had already completed its service acceptance trials in the US the Canadian test programme was able to proceed with minimal delay and was relatively trouble free. Within a matter of days of its first flight Lilly was even able to take 19101 through the sound barrier in a shallow dive.

However, this aeroplane was to be the only Sabre Mk. 1 because the Canadian government had already amended the original contract to take account of the latest version of the Sabre which had replaced the F-86A on the Inglewood, California production line, the F-86E-1-NA. All subsequent aircraft of the initial contract were built to this or to the improved F-86E-5-NA standard and designated Sabre Mk.2, with the RCAF serial num-



Canadair borrowed two Sabre Mk 6s, 23613/CF-JJC and 23628/CF-JJB from No. 4 Wing RCAF, in early 1957 for use as demonstration aircraft to show to the Swiss Air Force. They remained camouflaged and had rocket rails under the wings. Eventually the Swiss chose the Hawker Hunter but Swiss pilots were very impressed with the Sabre, calling it the 'best damn mountain climber' (via Terry Panopalis)

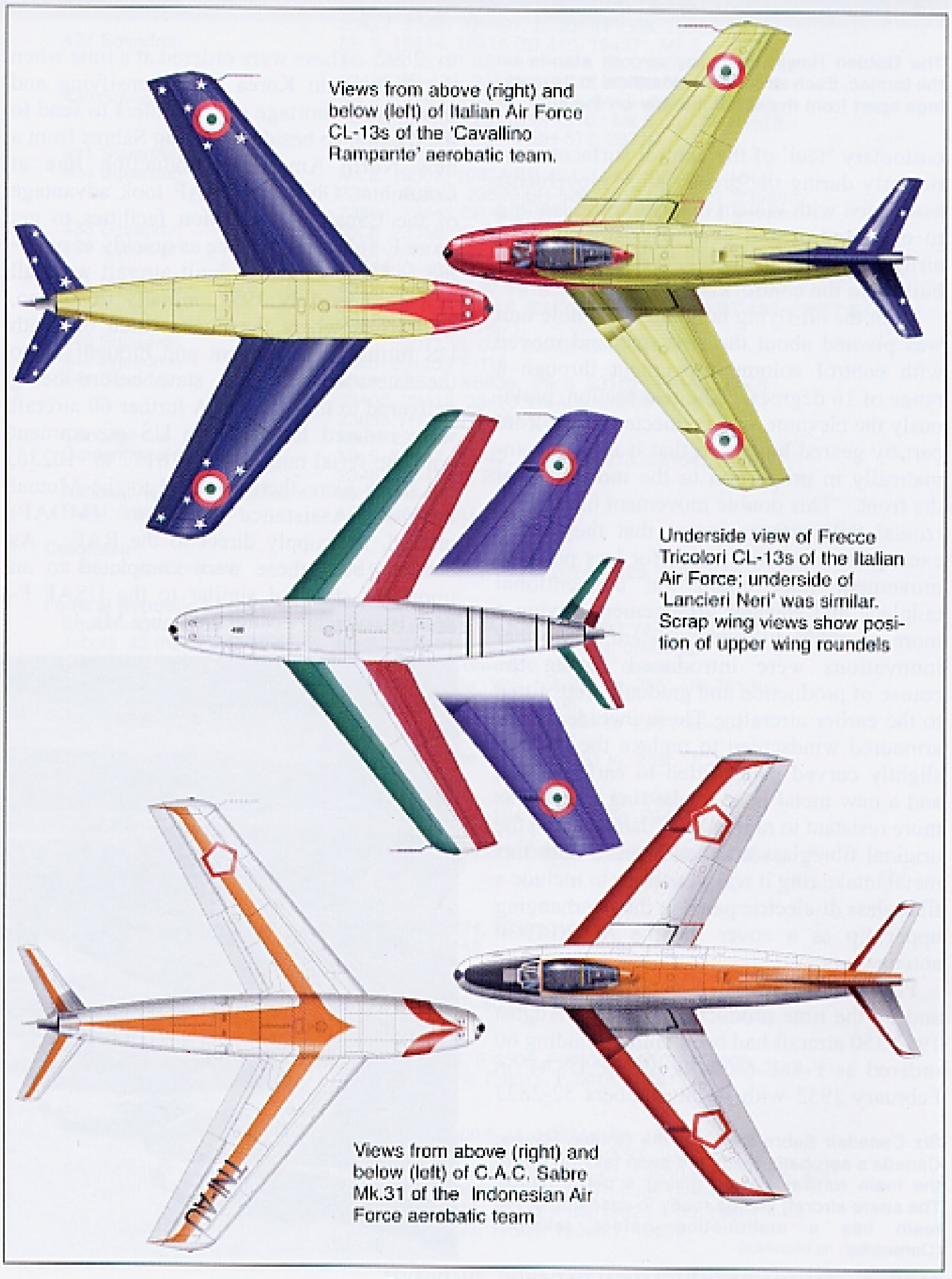


Sabre Mk.6 in the final operational colours of 444 Squadron RCAF, when based at Marville in France in 1962. Compare these with those on page 9. (Adrian Balch)

bers 19102-19199. The first of the new version reportedly made its maiden flight in October 1950, a month behind North American's prototype F-86E, but some sources give the date as being 31 January the following year. Deliveries to the RCAF began in April 1951.

The main improvement with the F-86E was that it was fitted with powered controls and an all-flying tailplane moving through the range +6 to –10 degrees, which significantly improved manoeuvrability and control responses at high subsonic and transonic speeds. Instead of the original direct mechanical linkages between the pilot's control column and the control surfaces, the ailerons and the new all-flying horizontal tail were now hydraulically operated. The control pressure was regulated by valves which responded in proportion to deflection forces applied to the control column by the pilot to give a more rapid and smoother response, with less physical effort required to overcome the aerodynamic forces acting upon the control surfaces. In the event of engine failure and the associated loss of the engine-driven main hydraulic pump, an electrical standby hydraulic pump cut in to maintain hydraulic pressure to the flying controls and other essential services.

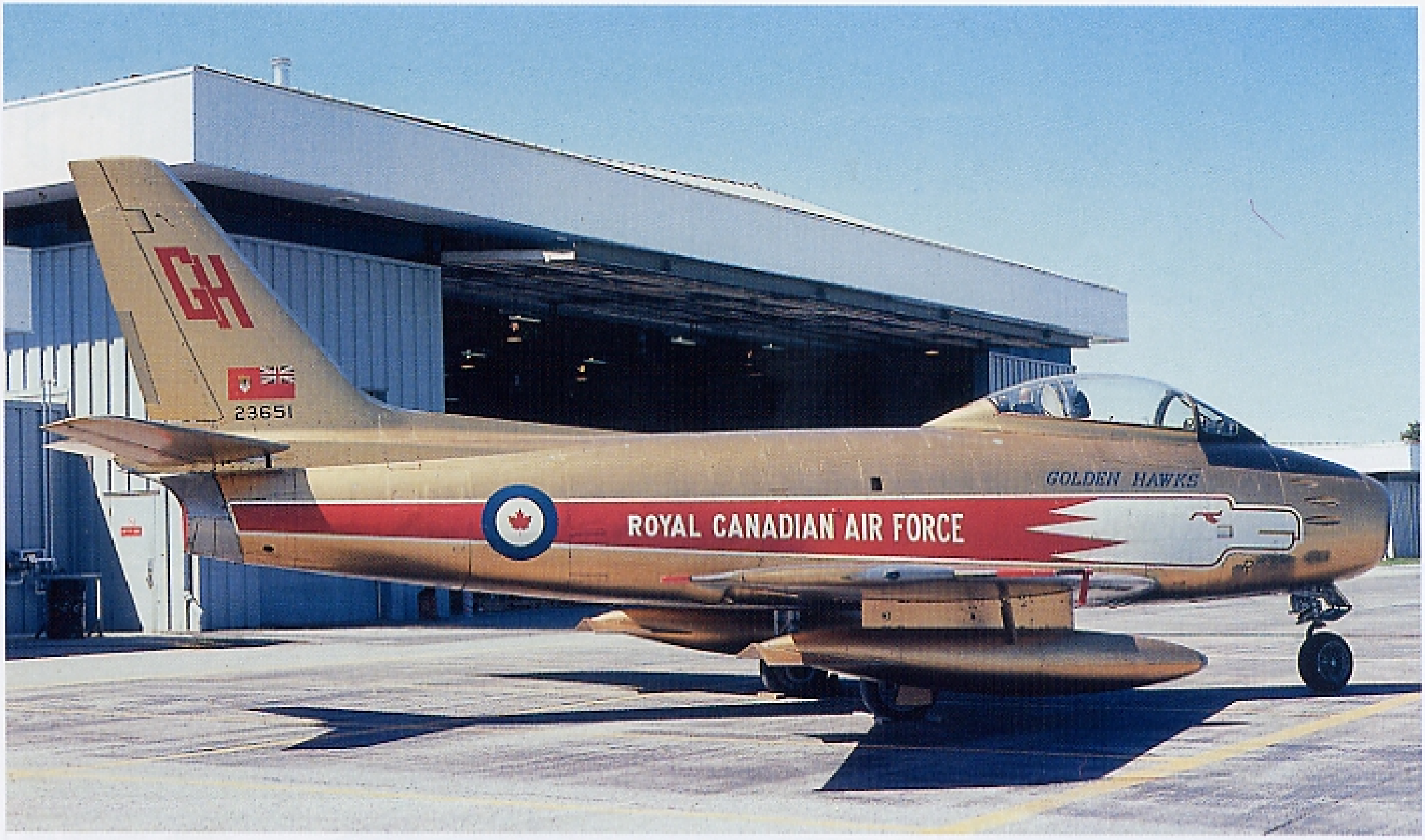
Apart from the one on the rudder, the earlier trim tabs were deleted from the control surfaces because a variable trim bias could now be set to the control column itself to give the desired neutral stick position for any phase of the flight. This bias then offset all the relevant control surfaces accordingly. The powered controls themselves were irreversible so that outside aerodynamic forces acting upon the control surfaces would not set up shock waves within the hydraulic lines which would be transmitted back to the stick. However this system would have robbed the pilot of the



Views from above (right) and below (left) of Italian Air Force CL-13s of the 'Cavallino Rampante' aerobatic team.

Underside view of Frecce Tricolori CL-13s of the Italian Air Force; underside of 'Lancieri Neri' was similar. Scrap wing views show position of upper wing roundels

Views from above (right) and below (left) of C.A.C. Sabre Mk.31 of the Indonesian Air Force aerobatic team



The Golden Hawks stand-by aircraft stands on the tarmac. Each aircraft was identical in its markings apart from the serial number on the fin.

customary 'feel' of the control surfaces, particularly during the greater stick movements associated with violent manoeuvring, leading to over-control and even over-stressing the airframe, so an artificial 'feel' system was built in to the control column.

With the all-flying tailplane the whole unit was pivoted about the rear spar and moved with control column movement through a range of 16 degrees. The rear section, previously the elevator, was connected to the front part by geared hinges so that it moved automatically in proportion to the movement of the front. This double movement of the horizontal tail surfaces meant that they could exert greater control forces for less physical movement than could the conventional tailplane and elevator arrangement, giving a more responsive control system. Further innovations were introduced during the course of production and gradually retrofitted to the earlier aircraft. These included a flat armoured windscreen to replace the original slightly curved panel fitted to early Sabres, and a new metal nose intake ring which was more resistant to rain erosion damage than the original fibreglass one had been. With this metal intake ring it was necessary to include a fibreglass di-electric panel in the overhanging upper lip as a cover for the AN/APG-30 antenna.

Further orders for the Sabre Mk.2 followed and by the time production ended in August 1952 350 aircraft had been built, including 60 ordered as F-86E-6-CANs by the USAF in February 1952 with serial numbers 52-2833 to -2892. These were ordered at a time when the fighting in Korea was intensifying and there was a shortage of jet fighters to send to the theatre, so besides ordering Sabres from a new North American production line at Columbus, Ohio, the USAF took advantage of the Canadair production facilities to get more F-86Es in to service as quickly as possible. These Canadian-built aircraft were all delivered by July 1952, initially to Fresno, California, where they were fitted out with US furnished equipment and brought up to the latest modification state before being delivered to the USAF. A further 60 aircraft were ordered later by the US government with the serial numbers 52-10177 to -10236, but these were then assigned to the Mutual Defense Assistance Program (MDAP) instead, for supply direct to the RAF. As actually built these were completed to an improved standard similar to the USAF F-86E-10, which became the Sabre Mk.4.

From the beginning of Canadair's involvement with the Sabre programme it had been the company's intention to adapt the design to meet specific RCAF requirements and to improve the aircraft wherever possible, which included the replacement of the American J47 engine with one of Canadian design and manufacture. Accordingly Avro Orenda had begun to design a turbojet of a suitable size to fit into the Sabre fuselage and by 1950 the Orenda 1 engine was ready for air testing. North American had modified F-86A 49-1069 to evaluate the Canadian engine with the company designation NA-167, and in October 1950 this began flight testing at Muroc. The trials with 49-1069 which was sometimes referred to as the F-86J were encouraging, so work on the engine continued, but the US did not adopt the Orenda most probably because of the disruption such a change would have had on the Sabre production lines. For a time the F-86J was

Six Canadair Sabre Mk.5s of the Golden Hawks, Canada's aerobatic team, are seen taxying out to the main runway before giving a performance. The spare aircraft stands ready in case one of the team has a malfunction before take-off. (Canadair)

loaned to Avro Canada for engine trials before returning to the USA in 1954, and as the engine showed much promise the Canadians decided to set aside what was to have been the 99th production Sabre Mk.2, 19200, to become the Canadian Orenda trials aircraft.

This airframe was given the designation Sabre Mk.3 and modified to receive the 6,000 lb s.t. Orenda 3 engine which was of slightly larger diameter than the J47, necessitating modifications to the engine bay. It made its maiden flight from Cartierville on 25 September 1952 and the soundness of the engine design was confirmed when Jacqueline Cochran gained the women's world air speed record flying 19200 over the Muroc salt flats on 3 June 1953, achieving a speed of 675.471 mph (1,087 km/hr). Cochran had already become the first woman to break the sound barrier when she achieved 652.552 mph (1,050 km/hr) at Muroc on 18 May that year, also in 19200. The Orenda 3 then underwent further development and was suitably modified to permit mass production, eventually to emerge as the more powerful Orenda 10 engine which powered the Sabre Mk.5

IMPROVED POWER

On completion of the Sabre Mk.2 orders it had originally been planned to switch production to the Sabre Mk.4 powered by the Orenda 3, but as the engine was not ready for production in time the new aircraft came off the Canadair production line still powered by the American J47-GE-13. Although still based on the F-86E the Sabre Mk.4 did have some improvements over the Mark 2 and was essentially to the same standard as the USAF F-86E-10-NA coming off the North American production line in 1952. By a strange coincidence these had also been due to receive a new engine, the up-rated J47-GE-27, but as this too was not yet ready they retained the original J47-GE-13. New features included an improved compass system and refinements to the cockpit pressurisation and air conditioning, and the cockpit canopy now had a manual jettison facility. Hitherto canopy jettison had been possible only as part of the ejection sequence. Further modifications included moving the IFF aerial from the fin-tip to the fuselage underside between the wings where it was less likely to be masked from ground radar interrogation pulses. Soon after production started the new type A-4 gun/bomb sight replaced the earlier A-1CM sight, and from aircraft 19655 onwards the tailplane pitch actuator was repositioned from amidships to the rear fuselage.

The first Sabre Mk.4 flew on 28 August 1952 and in all 438 examples were built and delivered during the course of 1952-53, with the serial numbers 19453-19890. The majority of these served with RAF units under MDAP arrangements, but 71 did serve with the RCAF as an interim fighter pending delivery of the Orenda-powered Sabres which were planned to become the mainstay of the RCAF day fighter force. The survivors of these were eventually also transferred to the RAF. Some late production aircraft were fitted with the improved wing designed for the Sabre Mk.5, and many Sabre Mk.4s along with some Mk.2s were later returned to Canadair also to be fitted with this new wing.

THE SABRE IN SQUADRON AND UNIT SERVICE

Main Squadrons or Units	Representative examples
Australia	
2(F) OTU/OCU	Mk.31 A94-912, -920 –922, -928. Mk.32 A94-356, -365, -366, -369.
5 OCU	Mk.32 A94-982, -366.
3 Squadron	Mk.32 A94-955, -960, -966, -972, -974, -979, -980.
75 Squadron	Mk.32 A94-352, -353, -359, -365, -367, -369.
76 Squadron	Mk.31 A94-901, -919, -931, -942. Mk.32 A94-947, -983, -359.
77 Squadron	Mk.30 A94-917. Mk.32 A94-965, -978, -986, -987, -988, -990.
79 Squadron	Mk.32 A94-967, -969, -984, -986.
ARDU, Laverton	Mk.32 A94-946.
WRE, Woomera	Mk.31 A94-915, -922.
Bangladesh	
Unknown	Mk.6 1802
Canada	
1 OTU/STU	Mk.5 23238, 23270.
400 Squadron	Mk.5 23208:GW-208.
401 Squadron	Mk.5 23315:AB-315.
410 Squadron	Mk.2 19102:AM-N, 19141:AM-K, 19144:AM-T, 19159:AM-159, 19170, 19176:AM-176. Mk.6 23402.
411 Squadron	Mk.5 23215:KH-215.
413 Squadron	Mk.2 19224:AP-224. Mk.4 XB821. Mk.5 23116:AP-116, 23139:AP-139, 23146:AP-146, 23178:AP-178.
414 Squadron	Mk.4 19455:AQ-455, 19653:AQ-653, XB828. Mk.5 23343:AQ-343. Mk.6 23487:AQ-487
416 Squadron	Mk.2 19250:AS-250. Mk.5 23126:AS-126, 23226: AS-226. Mk.6 23650:AS-650.
421 Squadron	Mk.2 19220, 19287:AX-287, 19349:AX-349. Mk.5 23062:AX-062. Mk.6 23421, 23588, 23642:AX-642, 23653:AX-653, 23672, 23679:AX-679, 23715, 23751.
422 Squadron	Mk.4 19601/XB727. Mk.5 23049:TF-049. Mk.6 23422, 23497:TF-497, 23508:TF-508, 23605, 23741.
427 Squadron	Mk.2 19244, 19415:BB-415, 19427. Mk.5 23142: BB-142, 23191:BB-191. Mk.6 23420:BB-420, 23422, 23430:BB-430, 23522:BB-522, 23560:BB-560, 23731.
430 Squadron	Mk.2 19236:BH-236, 19342. Mk.5 23092:BH-092, 23139:BH-139, 23310:BH-310. Mk.6 23471, 23578, 23668:BH-668, 23677:BH-677, 23716.
431 Squadron	Mk.5 -
434 Squadron	Mk.2 19307, 19424:BR-424, 19434:BR-434. Mk.6 23414, 23480, 23520:BR-520, 23521:BR-521, 23569, 23624, 23642:BR-642, 23665:BR-665, 23674, 23707.
438 Squadron	Mk.5 23356:BQ-356.
439 Squadron	Mk.2 19114, 19190, 19204. Mk.5 23347:IG-247. Mk.6 23468:IG-468, 23513:IG-513, 23587:IG-587, 23616:IG-616, 23754.
441 Squadron	Mk.2 19149:BT-W, 19152:BT-C, 19163. Mk.5 23059:BT-059. Mk.6 23432:BT-432, 23495:BT-495, 23557:BT-557, 23650, 23671:BT-671.
442 Squadron	Mk.5 23071:SL-071, 23222:SL-222.
443 Squadron	Mk.5 23115:PF-115.
444 Squadron	Mk.4 XB823, XB830. Mk.5 23162:VH-162. Mk.6 23402, 23418, 23455:VH-455, 23508:VH-508, 23635:VH-635, 23691:VH-691.
Canadair Ltd, Cartierville	Mk.5 23102.
Golden Hawks	Mk.5 23037, 23042, 23066, 23073, 23164. Mk.6 23457, 23470:6, 23649, 23651.
National Aero. Establishment	Mk.6 23544.
RCAF Summerside	Mk.5 23350:SU-350.
Colombia	
1 Grupo de Combate	Mk.6 2021, 2022, 2023, 2024, 2025, 2026.
Federal Republic of Germany	
Erprobungstelle 61	Mk.6 S.6-1591:YA-105, S.6-1593:YA-043, S.6-1613: YA-042.
JaboG. 42 then LekG.42	Mk.6 'JC-101' onwards, 'JC-231' onwards.
JaboG. 43 then LekG.43	Mk.6 'JB-101' onwards, 'JB-231' onwards.
Jagdgeschwader 71	Mk.6 'JA-101 to -125', 'JA-231 to -255', 'JB-361 to -385'. e.g. S.6-1622:JA-108.
Jagdgeschwader 72	Mk.6 'JB-101 to -125', 'JB-231 to -255', 'JB-361 to -385'. e.g. S.6-1643:JB-110.
Jagdgeschwader 73	Mk.6 'JC-101 to -125', 'JC-231 to -255', 'JC-361 to -385'.
Waffenschule 10	Mk.5 'BB-161 to -194', 'BB-261 to -294'. Mk.6 'BB-161 to -194', 'BB-261 to -294', 0113.
Messerschmitt, Manching	Mk.6 S.6-1659:KE-105.
Schiessplatzstaffel	Mk.6 D9522, D9523, D9538, D9539, D9540, D9541.
Greece	
337 (or 342?) Moira	F-86E(M) -
341 Moira	F-86E(M) 12294, 12392, 12448.
343 Moira	F-86E(M) 19242.
Honduras	
Esc. de Caza-Bombardeo	F-86E(M) 3001, 3002, 3003, 3004, 3005, 3006.
Indonesia	
SkU. 14/Satuan Sergap F-86	Mk.32 F-8604, F-8605, F-8606, F-8607, F-8608, F-8609, F-8612, F-8615, F-8616, F-8617.
Italy	
2 Aerobrigata	F-86E(M) 19509:2-44, 19574:2-84, 19579:2-53, 19607:2-13, 19611:2-58, 19680:2-37, 19848:2-58.
4 Aerobrigata	F-86E(M) 19464:4-2, 19520:4-01, 19550:4-11, 19595: 4-31, 19684:4-48, 19685: 4-20, 19687:4-48, 19694: 4-44, 19766:4-50, 19782:4-83, 19829:4-66, 19841:4-44.
313 Gruppo (Frecce Tricolori)	F-86E(M) 19493, 19560, 19565:1, 19599, 19618

Continued on next page

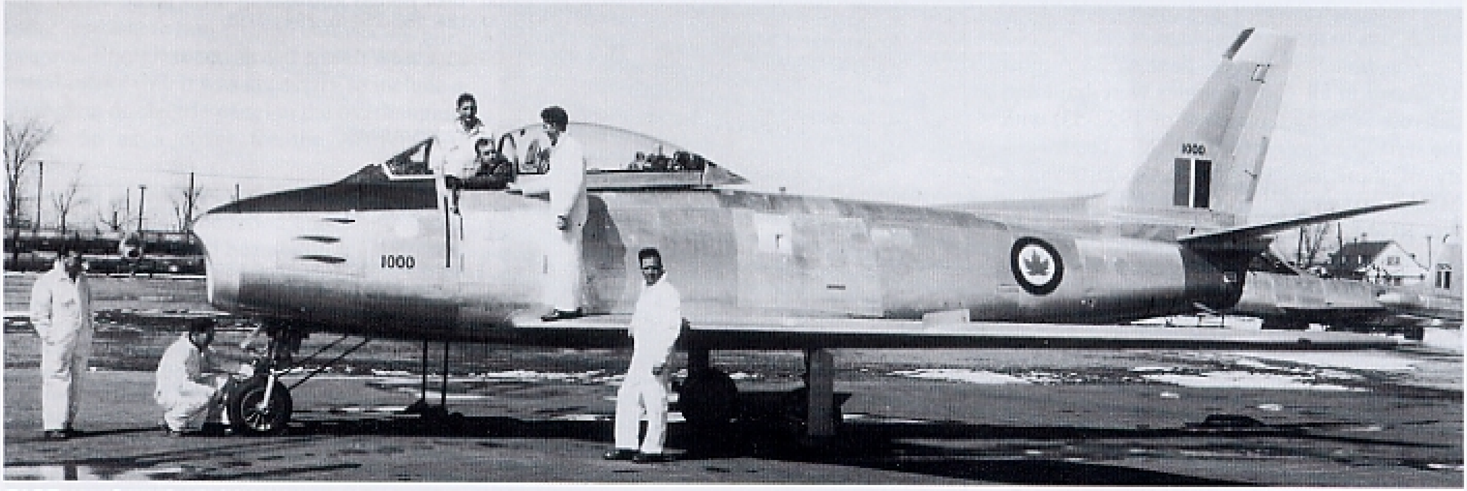
Continued from previous page

Main squadrons or units	Representative serials where known
Malaysia	
11 Squadron	Mk.32 FM1353, FM1354, FM1357, FM1359, FM1362 FM1903, FM1904, FM1905, FM1907, FM1911.
Pakistan	
14 Squadron	Mk.6 -
17 Squadron	Mk.6s used by the Masroor Wing (17 & 18 Sqdns) incl. 1622, 1627, 1634, 1656, 1690, 1702, 1728, 1739, 1747, 1751, 1776, 1783, 1789, 1790, 1792, 1810.
18 Squadron	
19 Squadron	Mk.6 -
South Africa	
1 Squadron	Mk.6 350:A, 371:M, 372, 377:O, 382:P.
2 Squadron	Mk.6 353:S, 354:A, 360:B, 374:N, 379:Q, 380:R, 383:M.
85 AFS	Mk.6 350, 352, 380.
Turkey	
141, 142, 143 Filo	F-86E(M) 19207, 19215, 19242, 19374, 19435.
United Kingdom	
3 Squadron	F.4 XB585:F, XB640:P, XB749:A, XB913:L.
4 Squadron	F.4 XB773:C, XB955:W, XB977:H.
20 Squadron	F.4 XB575:Q, XB645:W, XB900:A.
26 Squadron	F.4 XB595:W, XB613:C, XB708:T.
66 Squadron	F.4 XB791:X, XB941:S, XD715:K, XD753.
67 Squadron	F.4 XB598:R, XB600:W, XB664:B, XB671:E, XB683:V, XB737:A.
71 Squadron	F.4 XB630:P, XB632:R, XB728:V, XB878:X, XB974:O.
92 Squadron	F.4 XB694:N, XB837:K, XD719:T, XD727:D, XD769:J, XD771:K.
93 Squadron	F.4 XB695:X, XB712:F, XB804:O.
112 Squadron	F.4 XB593, XB675, XB746, XB802:O, XB920:K, XB944:L, XB978:N.
130 Squadron	F.4 XB682:V, XB706:U, XB800, XB918:R, XB929:Q, XB933:W, XB953, XB985:V.
147 Squadron	F.4 XB601, XB641, XB685, XB756, XB989.
229 OCU	F.2 XB531, XB532. F.4 XB616, XB641, XB666, XB696, XB756, XB795, XB813, XD780.
234 Squadron	F.4 XB575:N, XB680:G, XB792:X, XB838:P, XB867:E, XB885:D.
A&AEE Boscombe Down	F.4 XB733, XB992.
Bristol-Siddeley Engines	F.4 XB982, XB900.
CFE (AFDS)	F.2 XB532. F.4 XB622, XB666, XB677, XD781.
CGS (later FWS)	F.4 XB540:A, XB546, XB601, XB810.
Ferry Conversion Unit	F.2 XB530:A, XB531:B, XB532:C. F.4 XB537:E, XB544:H, XB601:P.
Overseas Ferry Unit	F.2 XB530, XB531, XB532.
RAE Farnborough	F.4 XB620.
RAFFC Handling Sqdn	F.4 XB936.
Sabre Conversion Flight	F.4 XB542, XB591, XB603, XB728, XB874, XB926, XB935, XB952.
Wing Leaders: Bruggen	F.4 XB702, XB893, XB945, XB987.
Geilenkirchen	F.4 XB615, XB827, XB948.
Jever	F.4 XB948.
Linton	F.4 XD763:EWW.
Oldenburg	F.4 XB886.
Wildenrath	F.4 XB619, XB702.
United States	
4 Fighter Wing (334, 335 & 336 FS)	F-86E-6-CAN 22857:FU-857, 22876:FU-876.
51 Fighter Wing (16, 25 & 39 FS)	F-86E-6-CAN 22882:FU-882.
Air National Guard incl.	
Maryland ANG	F-86E-6-CAN 22853.
Michigan ANG	F-86E-6-CAN 22837, 22848, 22860.
New Jersey ANG	F-86E-6-CAN 22872.
6585 Test Squadron	QF-86E 23209, 23259, 23268, 23300, 23320, 23338.
Boeing, Seattle	Mk.5 N8686F.
Flight Systems Inc., Mojave	Mk.5 N86FS, N91FS, N92FS, N93FS. Mk.6 N80FS, N81FS, N82FS, N83FS, N87FS, N89FS, N186FS.
Yugoslavia	
83 Vazduhoplovni Puk	F-86E(M) -
94 Vazduhoplovni Puk	F-86E(M) -
117 Vazduhoplovni Puk	F-86E(M) 11003, 11005, 11035.
204 Vazduhoplovni Puk	F-86E(M) -

By 1953 the Orenda 10 engine which initially delivered 6,355 lb s.t. had been cleared for service use and no time was lost in incorporating it into the Sabre production line. Because of the new engine and the engine bay modifications necessary to accommodate it Canadair gave the aircraft the revised type number CL-13A, and with the RCAF it became the Sabre Mk.5. The US Sabre version then in production was the F-86F fighter-bomber and various features from this were incorporated into the CL-13A, most noticeably the revised wing leading edges introduced on the F-86F-25-NH and F-86F-30-NA. This involved deletion of the leading edge slats which despite improving low-speed handling and manoeuvrability had generated sufficient drag to affect the aeroplane's top speed. The slats were replaced by a fixed wing leading edge extension measuring six-inches (15.3 cm) wide at the root and tapering to three inches (7.65 cm) at the tip, the so-called '6-3 wing' which increased wing area from 287.9 to 302.26 square feet. A small rectangular wing fence five inches (12.7 cm) high was also added to the front upper surface outboard of the mid-point to check the tendency for a tip-wise movement of the boundary air above the leading edge.

On the F-86F the new wing increased top speed by 14 knots at sea level over that of the F-86E as well giving an improved range due to the better aerodynamic characteristics of the whole wing. When on the Sabre Mk.5 this wing was combined with the more powerful Orenda 10 engine the improvement in overall performance was significant, despite the aircraft's empty weight being increased by nearly 400 lb (181.44 kg). For example, it took nine minutes for the Mk.5 to reach 40,000 ft instead of the 18 minutes it took the Mk.4 and its ceiling increased to 50,700 feet (15,453 m) from 42,500 feet (12,954 m). However, on the debit side the more powerful engine increased fuel consumption and so reduced range significantly.

Manoeuvrability was also improved for hitherto American Sabres in Korea had been at a disadvantage in high-level dog-fights since the MiG-15 was easily able to turn inside the Sabre, but the new wing gave the Sabre a much tighter turning circle. It delayed the onset of wing buffet allowing the pilot to turn more tightly before boundary

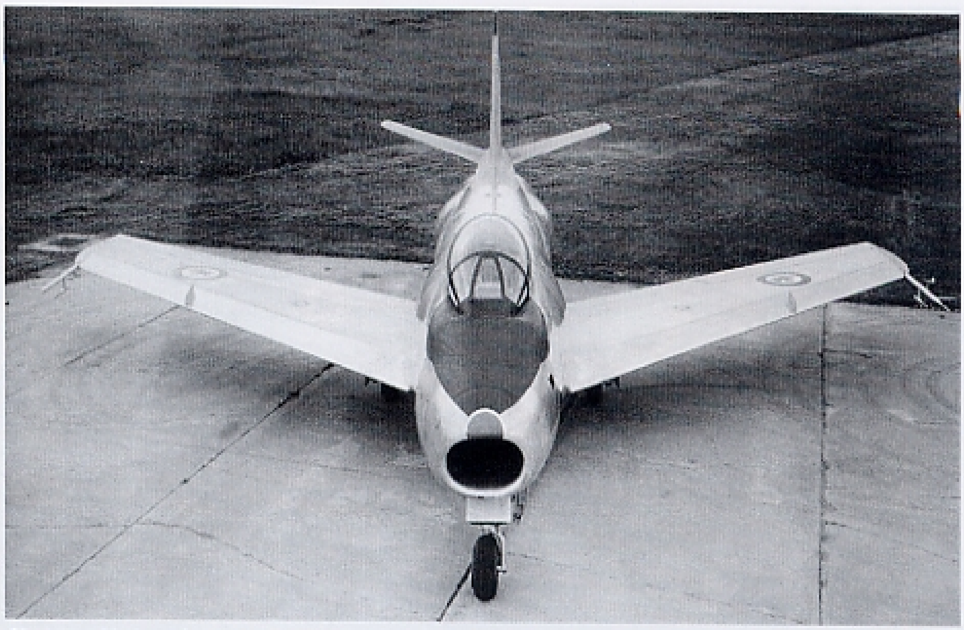


The 1,000th Sabre, a Mk.5 during pre-flight checks at Cartierville with test pilot Ian Mactavish in the cockpit. This aircraft was lost in May 1956 when the engine flamed out over New Brunswick. (Canadair via Terry Panopalis)

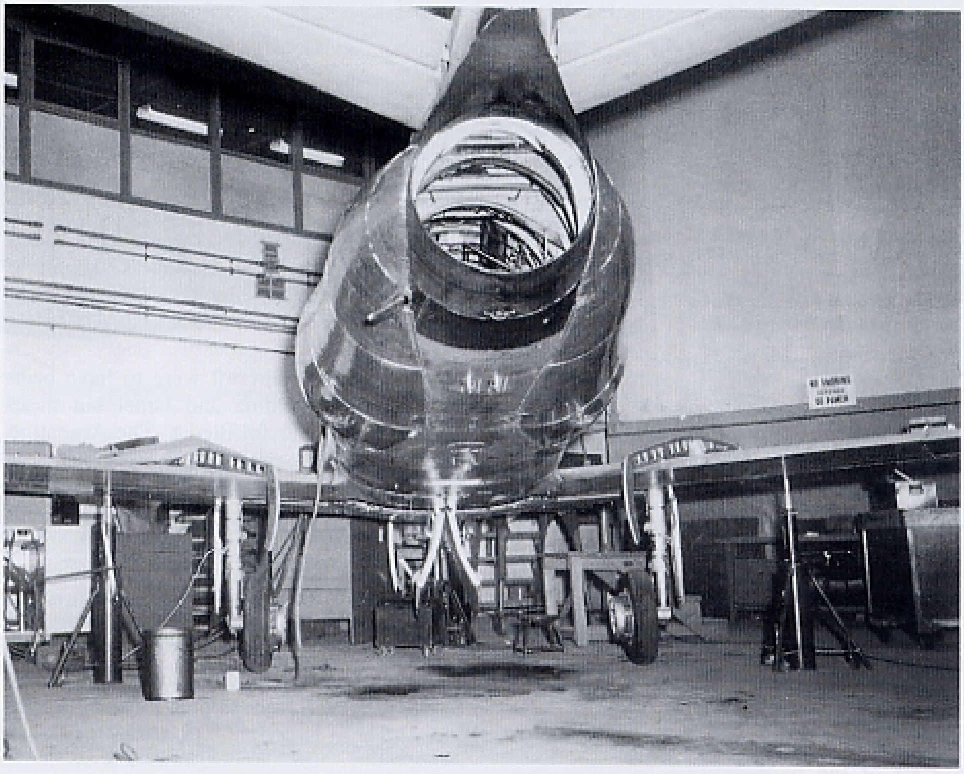
layer separation began which created the buffet and with it loss of lift and increased drag. However, there was a price to pay in low speed handling resulting in higher approach and landing speeds, with circuit speed for example rising by 5-10 knots (9-18 km/hr). The stalling speed also rose by around 10 knots and as the stall was approached there was now a tendency for the Sabre to yaw and to drop a wing suddenly.

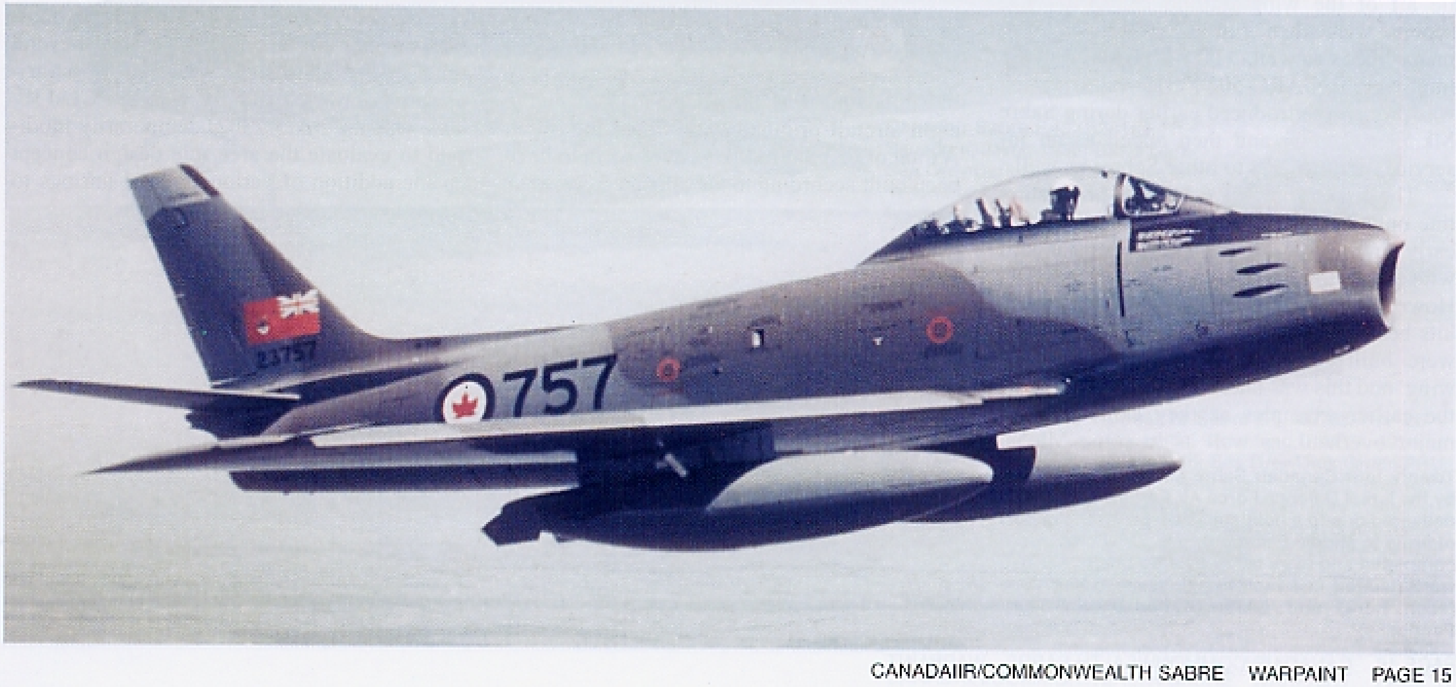
Once it became available the '6-3 wing' was fitted to some late production Sabre Mk.4s in view of the advantages it gave, then on 21 July 1953 the first production Sabre Mk.5 came off the Cartierville line and made its first flight nine days later. In all 370 Sabre Mk.5s were built to replace the earlier marks in service with the RCAF both at home and in Europe before production switched in 1954 to the final variant of the Canadair Sabre, the CL-13B Sabre Mk.6. A small number of aircraft were later designated Mk.5A when their armament, gun sight and fire control radar were removed and replaced with ballast to keep the aircraft's centre of gravity within permissible limits. These were possibly used for tactical flying training at Chatham towards the end of the Sabre's career, or even by the RCAF Golden Hawks aerobatic display team. Certainly aircraft assigned to the Golden Hawks, both Mk.5s and later Mk.6s, were fitted with a smoke generation system which may well have given rise to a revised designation. On these aircraft an oil tank probably replaced the guns in one or both gun bays with internal piping laid between the tank and the rear of the jet pipe so that the oil could be sprayed into the hot exhaust gas to generate white smoke for the display routines.

The Sabre Mk.6 used the 7,275 lb s.t. Orenda 14 engine which actually weighed some 300 lb (136.08 kg) less that the Orenda 10, and this greater power combined with the aircraft's lighter weight made it the best of all the Canadian Sabre variants. For example, its initial rate of climb was approaching 12,000 feet (3,657.6 m) a minute and it could reach 40,000 feet in some six minutes. Maximum speed at sea level was approaching 620 knots. Once again the aircraft's main

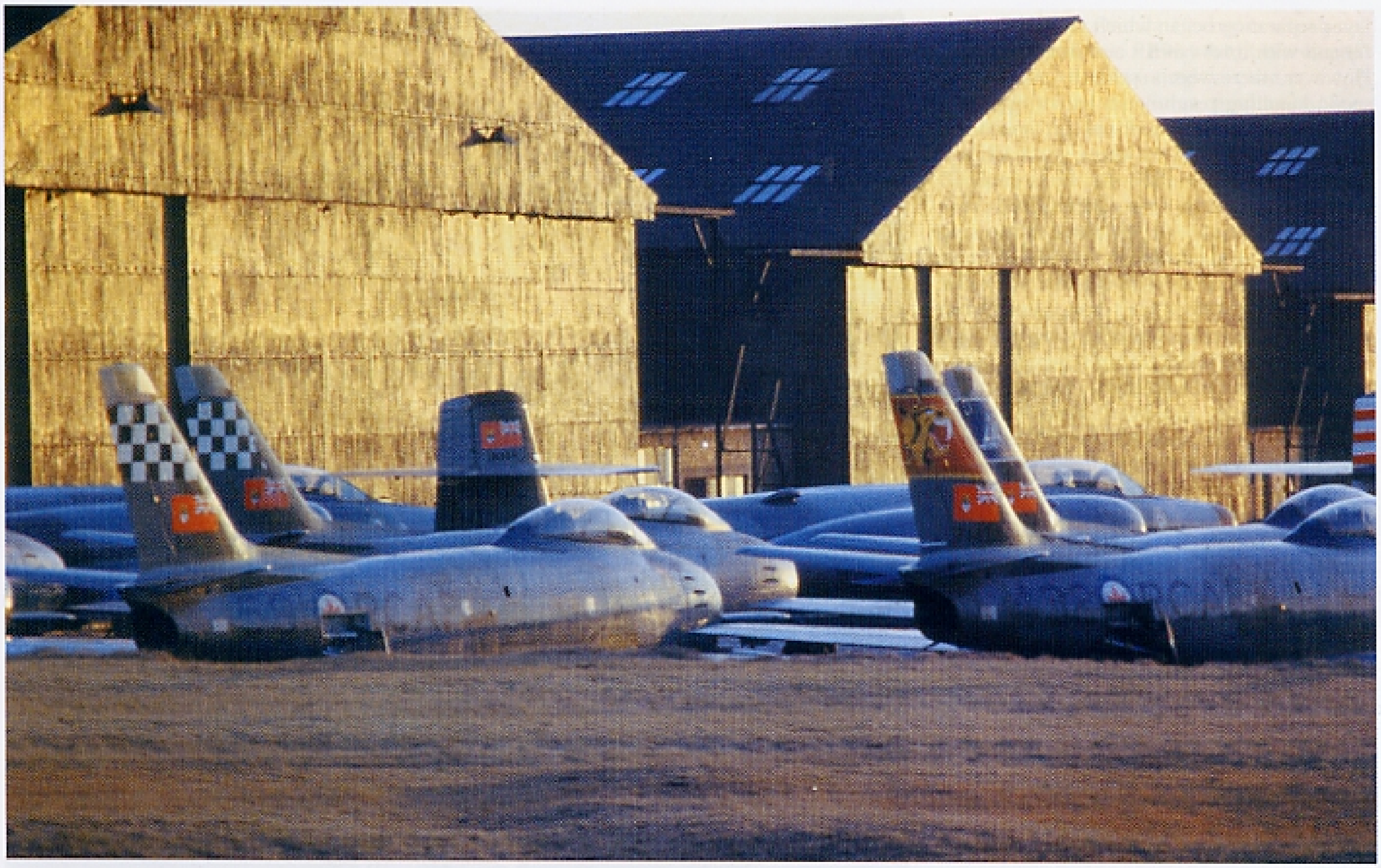


Above and below: Sabre Mk.5 23021 was modified in 1955 with glued on balsa wood bulges to evaluate area ruling. Peformance improvements were marginal and the modification was not proceeded with. (Canadair via Terry Panopalis)





Flight Lieutenant Bill Harvey, an Overseas Ferry Unit pilot shown flying Sabre Mk.6 23757, probably straight off the production line. (Canadair)



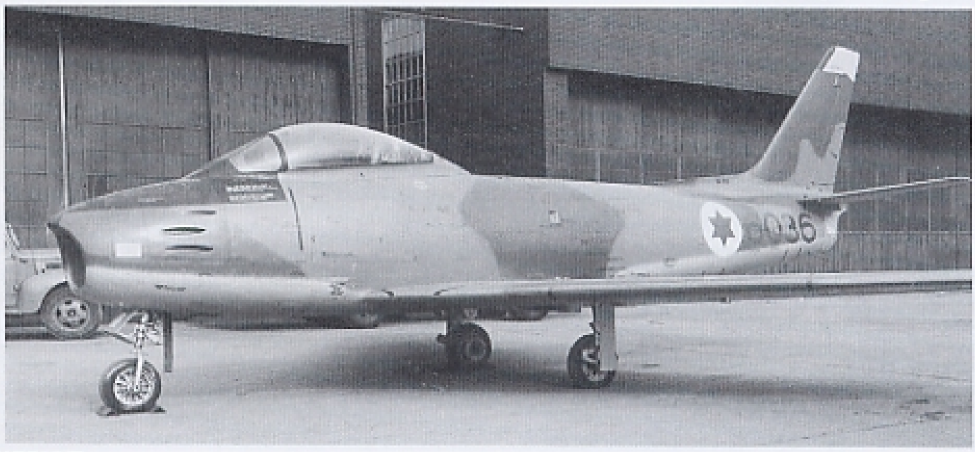
Time expired. RCAF Sabre Mk.5s, Mk.6s and CF-100s parked outside the hangars at Prestwick in February 1963. No other Mk.5s were refurbished after that date and the Mk.6s were broken up for scrap. (Adrian Balch)

external difference would be in the wing design which was based upon the F-86F-40-NH but without the extended wingtips or additional underwing pylons of that variant. The Mk.6 wing retained the original shape and dimensions of the '6-3 wing' but without the wing fence, and reintroduced the leading edge slats thereby going a long way towards combining the high level manoeuvrability of the Mk.5 with the low speed handling qualities of the Mk.4. To improve engine bay and jet-pipe tunnel cooling where the more powerful engine created higher running temperatures, a small ram air intake scoop was introduced low on either side of the fuselage a little aft of the wing trailing edge. These scoops were then fitted retrospectively to many Mk.5s as well. The Mk.6 also had the improved AN/ARC-502 VHF radio which was probably introduced earlier during Sabre Mk.5 production and then added as an in-service modification to other Sabres as well.

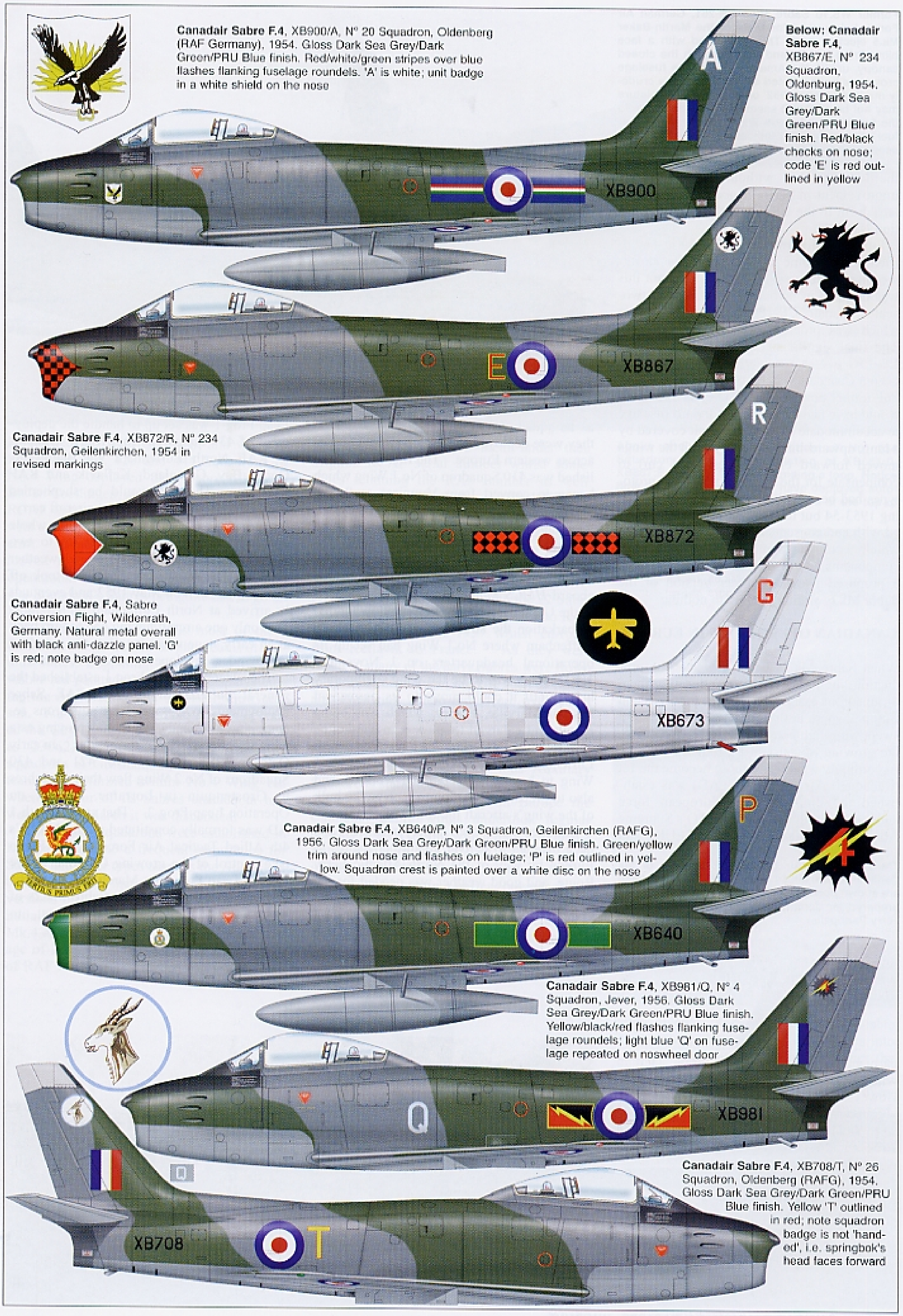
The first Sabre Mk.6 left the production line on 2 November 1954 and like the other early aircraft was built to an interim standard with the original solid '6-3 wing' of the Mk.5. However, once the necessary modification kits became available all aircraft from 23531 were built with the definitive '6-3 slatted wing' and this was later retrofitted to many of the earlier examples as they came due for major overhaul, as well as to some Mk.5s. Production lasted for four years and included 265 examples built for export to Colombia, South Africa and Federal Germany, all of which were probably built with the '6-3 slatted wing'.

Sixty further aircraft were to have been exported to Argentina and Israel but these orders were never fulfilled. The Argentine contract for 36 aircraft was cancelled for financial reasons whilst the Canadian government revoked the export license on the Israeli order in 1956 following the Suez Crisis. Subsequently this order too was cancelled, but not before about eight aircraft had reached various stages of assembly and been allocated the serial numbers 6030-6037. Of these at least 6036 was reported at Cartierville during September 1956 fully painted in Israeli markings. These Israeli aircraft almost certainly explain the differing reports of the total number of Sabre Mk.6s built. The RCAF supposedly ordered 382 aeroplanes but serial allocations account for 390 airframes, probably indicating that the RCAF took over the eight aircraft originally laid down for Israel. A total of 655 Sabre Mk.6s does seem to have been built according to the allocated Canadair construction numbers 1161-1815, with the last aircraft leaving the production line on 9 October 1958.

Further developments of the CL-13 were planned with most aiming to improve performance and extend the type's front line service career. The Sabre Mk.6 23544 underwent trials at the National Aeronautical Establishment during 1957 fitted with a locally designed afterburner in connection with the proposed CL-13C, whilst the CL-13J was a paper project to fit the Mk.6 with a Bristol-designed afterburner of a simplified design to that proposed for the CL-13C. However, these two projects were abandoned as operational fighters most probably because insufficient fuel could be carried to give a worthwhile endurance with afterburner selected. The CL-13D point defence interceptor was to have used an Armstrong-Siddeley Snarler rocket motor delivering 2,000 lb.s.t. to boost performance but this did not progress beyond the drawing board stage. During 1956 a trials aircraft which did fly was the CL-13E. This was the Mk.5 23021 temporarily modified to evaluate the area rule design concept by the addition of various bulged fairings to



Twenty four Canadair Sabre Mk.6s were ordered by the Israel Defence Force Air Force but were not delivered due to a political embargo on the export of arms to Middle East countries. Only eight were completed and were taken over by the RCAF. Two were painted in Israeli markings including 6036 (seen here) and 6033. (Canadair via Terry Panopalis)



Canadair Sabre F.4, XB900/A, Nº 20 Squadron, Oldenberg (RAF Germany), 1954. Gloss Dark Sea Grey/Dark Green/PRU Blue finish. Red/white/green stripes over blue flashes flanking fuselage roundels. 'A' is white; unit badge in a white shield on the nose

Below: Canadair Sabre F.4, XB867/E, Nº 234 Squadron, Oldenburg, 1954. Gloss Dark Sea Grey/Dark Green/PRU Blue finish. Red/black checks on nose; code 'E' is red outlined in yellow

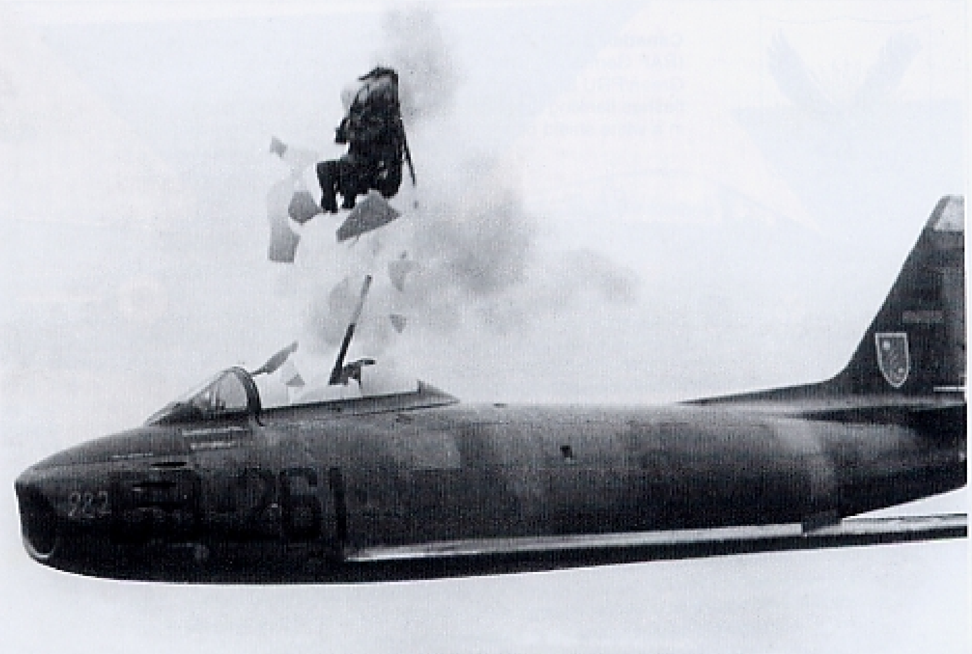
Canadair Sabre F.4, XB872/R, Nº 234 Squadron, Geilenkirchen, 1954 in revised markings

Canadair Sabre F.4, Sabre Conversion Flight, Wildenrath, Germany. Natural metal overall with black anti-dazzle panel. 'G' is red; note badge on nose

Canadair Sabre F.4, XB640/P, Nº 3 Squadron, Geilenkirchen (RAFG), 1956. Gloss Dark Sea Grey/Dark Green/PRU Blue finish. Green/yellow trim around nose and flashes on fuelage; 'P' is red outlined in yellow. Squadron crest is painted over a white disc on the nose

Canadair Sabre F.4, XB981/Q, Nº 4 Squadron, Jever, 1956. Gloss Dark Sea Grey/Dark Green/PRU Blue finish. Yellow/black/red flashes flanking fuselage roundels; light blue 'Q' on fuselage repeated on noswheel door

Canadair Sabre F.4, XB708/T, Nº 26 Squadron, Oldenberg (RAFG), 1954. Gloss Dark Sea Grey/Dark Green/PRU Blue finish. Yellow 'T' outlined in red; note squadron badge is not 'handed', i.e. springbok's head faces forward



Former WS.10 Sabre Mk.5 BB-261, German Air Force, being used for trials of the Martin-Baker Mk.5 ejection seat. This was fitted with a face blind firing handle and fired through the closed canopy, unlike the American seat. The fuselage cross has been painted out and there is a crudely marked number '982' on the nose. The picture may not be all that it seems as the sharp edge to the fuselage underside and absence of the rear fuel jettison pipe may indicate that the picture has been retouched for publicity purposes.

the fuselage, but without any significant improvement in performance. This aircraft later went to the USA with the civil registration N1049D.

Fitting an airborne intercept radar in a modified nose radome was proposed for an all-weather fighter variant, the CL-13H, but this was dropped in favour of the dedicated two-seat Canadair CF-100 all-weather fighter which was ordered by the RCAF instead. The final significant Sabre project was the CL-13G two-seat trainer which was to have been a Canadair version of the American TF-86F trainer powered by an Orenda 14. This would have had an extended forward fuselage to accommodate a tandem cockpit covered by a long, upward-hinged canopy, with the wings moved forward eight inches (20.4 cm) to compensate for the longer nose. The prototypes had been built by North American during 1953-54 but the version was not proceeded with and consequently Canadair's project, which would have required American-built components, came to nothing. The CL-13F, a proposed two-seat fighter version of the Sabre Mk.6, similarly came to nothing.

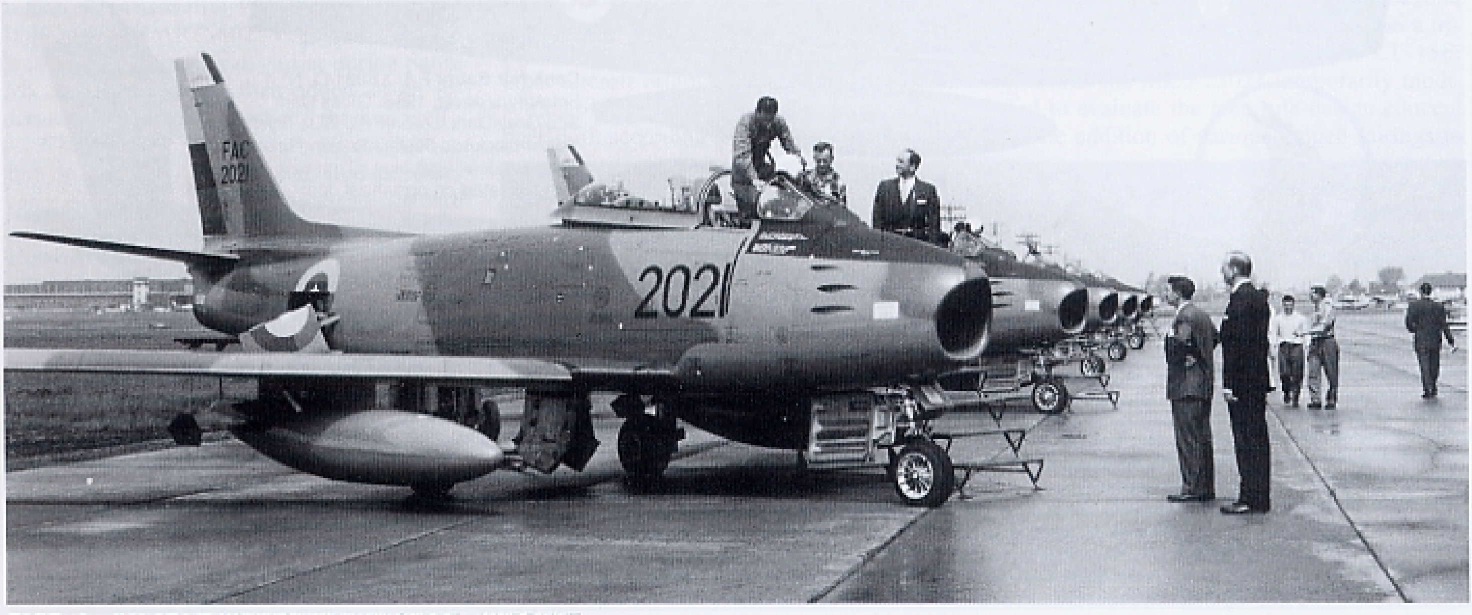
CANADIAN OPERATIONS IN EUROPE

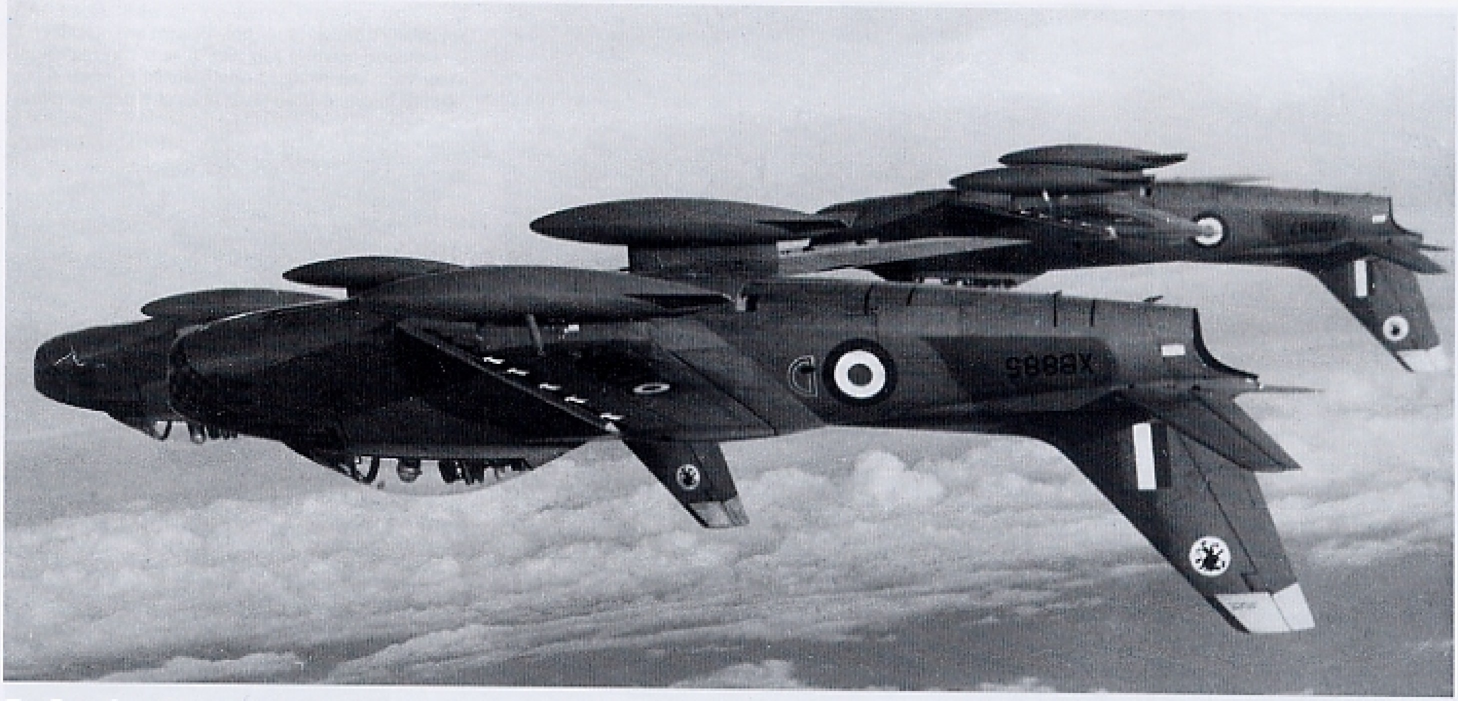
When Sabre Mk.2s began to leave the production line priority went to allocating them to squadrons assigned to NATO for service in Europe, where at the time no European-built swept wing fighters were available to counter the growing Soviet and Eastern Bloc threat. Accordingly what was later to become the 1st (Canadian) Air Division (1 AD) was established to administer this European force under the overall control of NATO's Supreme Allied Commander, Europe (SACEUR), and as its squadrons were formed in Canada so they were deployed to their operational bases across western Europe. The first to be established was 410 Squadron of No.1 Wing which began to convert from Vampires at RCAF Dorval in the spring of 1951, followed by 441 then 439 Squadrons as more aircraft became available. During that autumn the Sabres for 410 and 441 Squadrons were flown to NAS Norfolk, Virginia, where they were loaded aboard *HMCS Magnificent* and then shipped to the UK during November. Following disembarkation the aircraft flew to RAF North Luffenham where No.1 Wing had set up its operational headquarters on 1 November 1951. This was to be the wing's temporary home until it could move to its permanent base at Marville, France, which was being rebuilt and enlarged to allow it to handle the new jet fighters. The RAF vacated North Luffenham on 15 November allowing No.1 Wing to begin its operational work-up and also to prepare the station to receive the bulk of the wing's aircraft the following summer.

Summer was chosen largely because it had been decided to deliver all further Sabres to Europe by way of the North Atlantic Ferry Route, and good weather was needed for the first such deployment in order to establish the viability of the plan. Accordingly Operation Leap Frog 1 was set up to handle the deployment of 439 Squadron from RCAF Uplands to RAF North Luffenham via Bagotville, Goose Bay, Greenland, Keflavik and RAF Kinloss. The jets would be shepherded across the Atlantic by transport aircraft carrying ground crew and spares and the whole operation was expected to last up to two weeks allowing for rest stops and weather delays. The squadron's 22 Sabres took off from Uplands on 30 May 1952 and eventually arrived at North Luffenham on 15 June, with only one aircraft having had to turn back at an early stage when its pilot, the squadron commander, developed medical problems.

The success of Leap Frog 1 established the general pattern for future RCAF Sabre deployments to Europe, with squadrons re-equipping in Canada and then deploying as a wing to Europe in large formations. In early October 1952 numbers 416, 421 and 430 Squadrons of No.2 Wing flew their 56 Sabres to Grostenquin in Lorraine, France, on Operation Leap Frog 2. That same month 1 AD was formally constituted within NATO's 4th Allied Tactical Air Force (4 ATAF), to take control of the growing Canadian Sabre force. Leap Frog 3 in March 1953 saw the deployment of No.3 Wing's Sabre Mk.2s of 413, 427 and 434 Squadrons to

The Columbian Air Force took delivery of six Canadair Sabre Mk.6s in June 1956. Five of these are shown outside Building 117, Cartierville being prepared for departure to Bogota. (Canadair via Terry Panopalis)





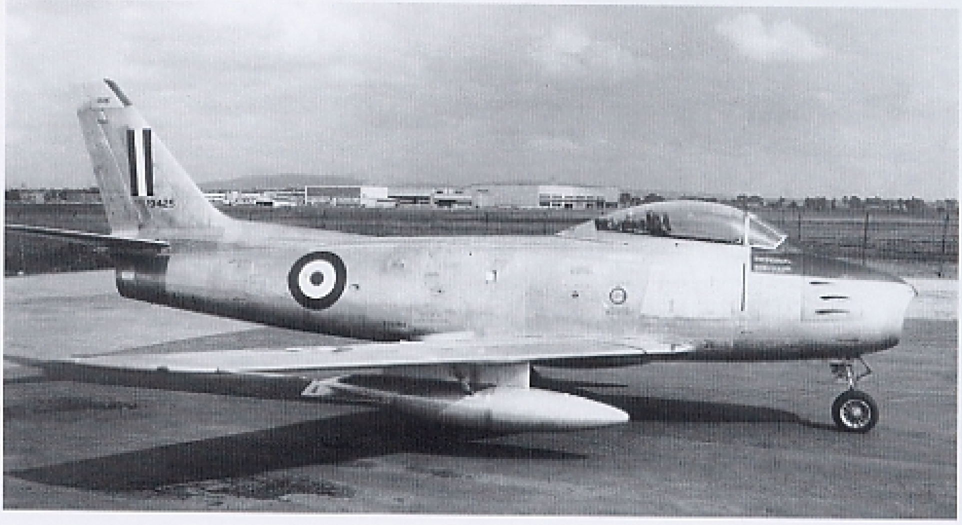
Above and below: A formation of No. 234 Squadron Sabre F.4s consisting of XB885:D, XB867:E and XB748:F performaing a loop. Notice how the leading edge slats have deployed automatically as the aircraft lose speed at the top of the loop (MoD)

Zweibruecken, West Germany, and when in September 414, 422 and 444 Squadrons of No.4 Wing deployed their Sabre Mk.4s to Baden-Soellingen, also in West Germany, the RCAF Sabre force in Europe was complete, with a combined strength of around 300 aircraft. Finally, early in 1955 No.1 Wing moved from RAF North Luffenham to its operational base at Marville, Lorraine, with 439 Squadron's Sabres being the last to go on 31 March.

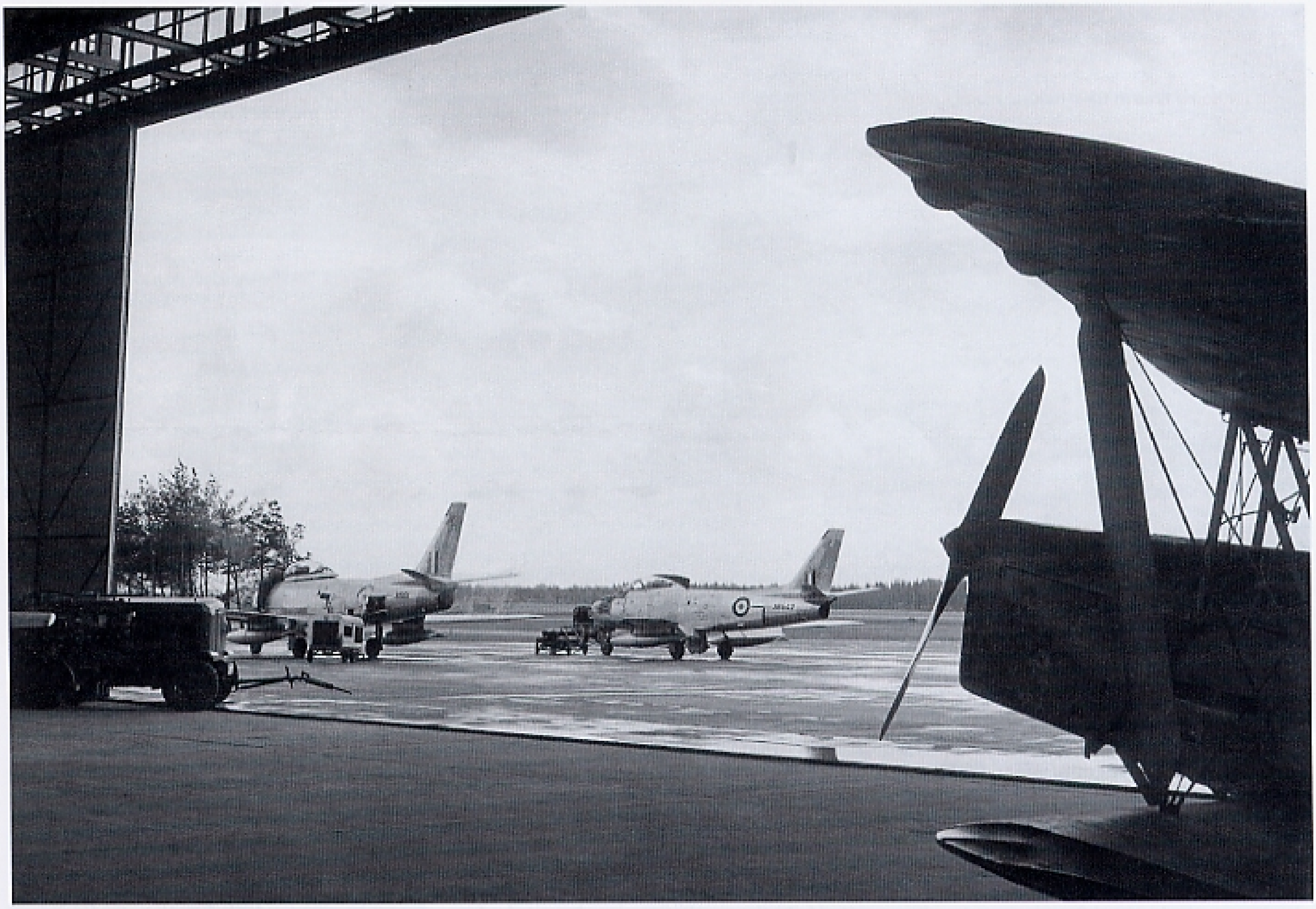
During the mid 1950s most of these Canadian wings fielded display teams at various times, beginning with the 'Fireballs' whose red painted aircraft gave displays during the April-September 1954 air show season. For the 1955 season No.2 Wing operated the 'Sky Lancers' which drew aircraft such as 23062, 23310 and 23483 from the squadrons at Grostenquin, then in 1956 the team was reformed within No.4 Wing but when all four of its Sabres crashed in bad weather that March it was disbanded.

Once these squadrons were established in Europe it became a frequent occurrence for Sabres and other types to cross the Atlantic in both directions, then from late 1953 newer versions of the Sabre began to be delivered, initially replacing the Mk.2s and then the Mk.4 aircraft as well. At one point a shortage of RCAF Sabres necessitated a quantity of RAF Mk.4s being loaned to the Canadian squadrons who operated them under their original RCAF serial number whilst sometimes retaining the RAF number as well. Examples included 19491/XB584, 19675/XB821, 19677/XB823, 19680/XB826 and 19684/XB830. By the end of 1954 I AD had re-equipped with Sabre Mk.5s and by mid-1957 these had in turn been replaced by Sabre Mk.6s. Again the aircraft were delivered in mass formations, as with the 22 Sabre Mk.6s which were forced to divert into RAF Kinloss on 9 March 1957 whilst en-route from Keflavik to France. As they were replaced many of the early Sabres were flown to various locations in the UK such as Speke and Prestwick where they were overhauled prior to being passed on to other air arms. The Sabre Mk.5s however, were mostly returned to Canada following overhaul at Prestwick and issued to various Auxiliary Squadrons stationed across the country.

Throughout their time in Europe the Canadian Sabre wings undertook regular periods of alert during which they provided a Battle Flight of two aircraft each, to be at immediate readiness to intercept any unidentified contacts within a buffer zone which ran down the eastern border of the Federal Republic of Germany. In time of actual war all available aircraft had to be capable of being launched to intercept incoming attacks within one hour of the order to scramble being given. Radar control was available from ground stations to get the fighters into the vicinity of the enemy but thereafter the emphasis was very much on gaining visual contact with enemy formations and overwhelming them by sheer weight of numbers. During times of tension individual squadrons and flights would be deployed to other airfields in eastern France and western Germany both to improve their chances of survival in the event of nuclear attack and to give a better defence in depth against the massed formations of enemy aircraft which were expected. Also, the Sabres would provide a widely



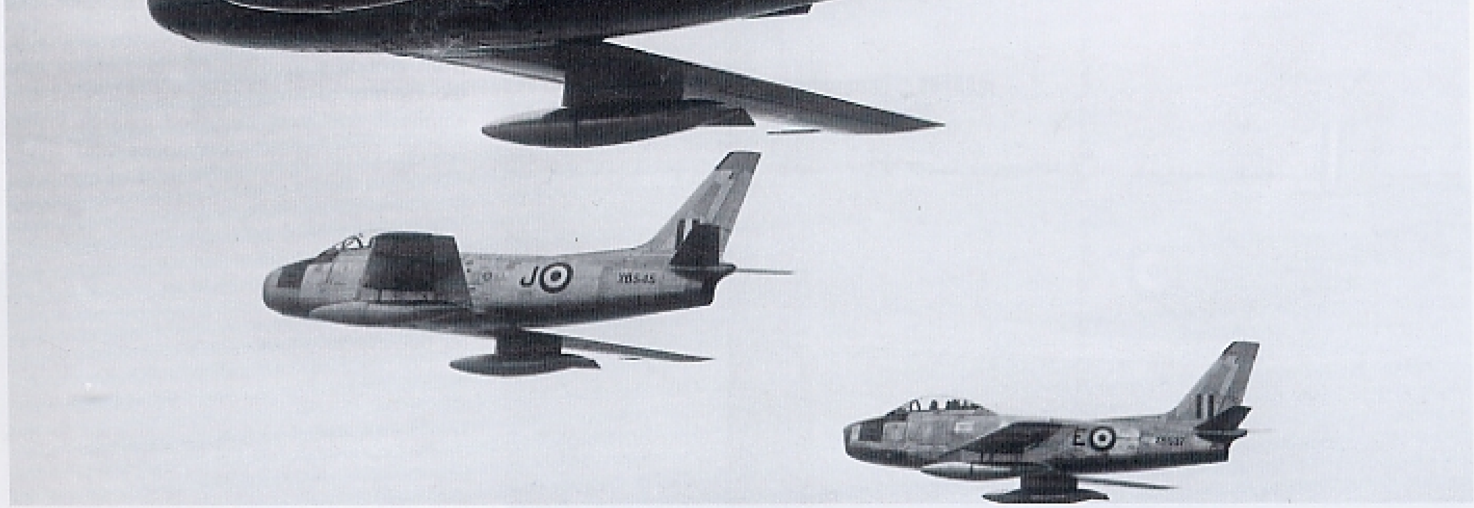
This Sabre was an F-86E(M) and went to the Greek Air Force. It has the blue and white fuselage roundels and fin flash and the serial is 19425. (Canadair)



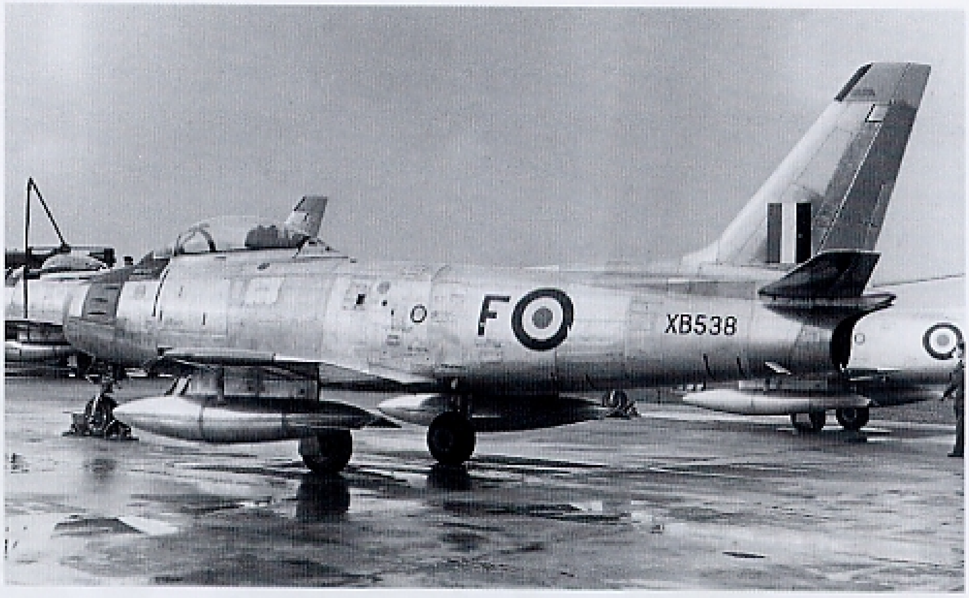
A pair of Sabre F.4s outside an RAF Germany hangar. The aircraft are XB611 and XB542 of the Sabre Conversion Flight so the picture may have been taken at Wildenrath. (MoD)

dispersed armed reconnaissance force to report on the movements of enemy armoured columns.

The next significant change to the composition of 1 AD occurred from 1956 when, at NATO's request, each wing acquired an all-weather fighter capability. This was achieved between November 1956 and August 1957 by transferring four of the RCAF's all-weather air defence squadrons equipped with the Canadair CF-100 Canuck from Canada to Europe. One of these was assigned to each fighter wing in place of one of its Sabre squadrons, beginning with No.1 Wing. The Sabre units withdrawn in this way were numbers 410, 413, 414 and 416 Squadrons, with some of their aircraft probably remaining in Europe to increase the establishment of the other Sabre squadrons or else going into storage. 1957 also saw the start of regular Canadian Sabre detachments to the NATO weapons range at Decimomannu, Sardinia, for air-to-air gunnery and air-to-



Sabre F.4s of the Ferry Training Unit, Abingdon with XB537:E and XB545:J in the natural metal delivery finish, and XB543:G in its operational camouflage but still with silver underwing pylons and drop tanks. The latter has its air brakes slightly open presumably to keep station on the formation leader. (MoD)



RAF Sabre F.4s of the Ferry Training Unit with XB538:F in the foreground. Such was the need for these aircraft that it was not initially possible to paint them in camouflage colours and they were flown for some time in their natural metal finish.

ground weapons training, something previously undertaken at Rabat, Morocco, which had required a more arduous transit flight and greater maintenance support.

OBSOLESCENCE APPROACHES

Towards the end of the decade the RCAF was finalising plans for the replacement of its Sabre force. When it was introduced in 1955 the Sabre Mk.6 was an excellent day fighter but it was never ideally suited for the European theatre. Most significant was its lack of endurance which, when taken alongside the notoriously changeable weather experienced in central Europe, imposed severe limitations on the fighter's operational flexibility. Coupled with this was its lack of radar and its inability to carry the air-to-air guided missiles then being introduced into service in NATO air arms.

The RCAF requirement was initially for a radar-equipped air defence fighter armed with guided missiles but this was later changed to a nuclear strike fighter which could also carry out tactical reconnaissance missions, and following consideration of a number of designs the choice fell upon the Lockheed F-104 Starfighter. At the time this was also being considered for a number of other NATO air forces and plans were being drawn up to build the type under license in Europe in the event of its being selected. In view of the success of the CL-13 building programme the Canadian government decided to follow the same course and for Canadair to build the Starfighter under license as the CF-104, and this was duly announced in parliament on 2 July 1959. That August an order was announced for 200 Canadair Starfighters with the company designation CL-90 and the prototype, modified from a Lockheed-built F-104A, made its first flight in September 1960.

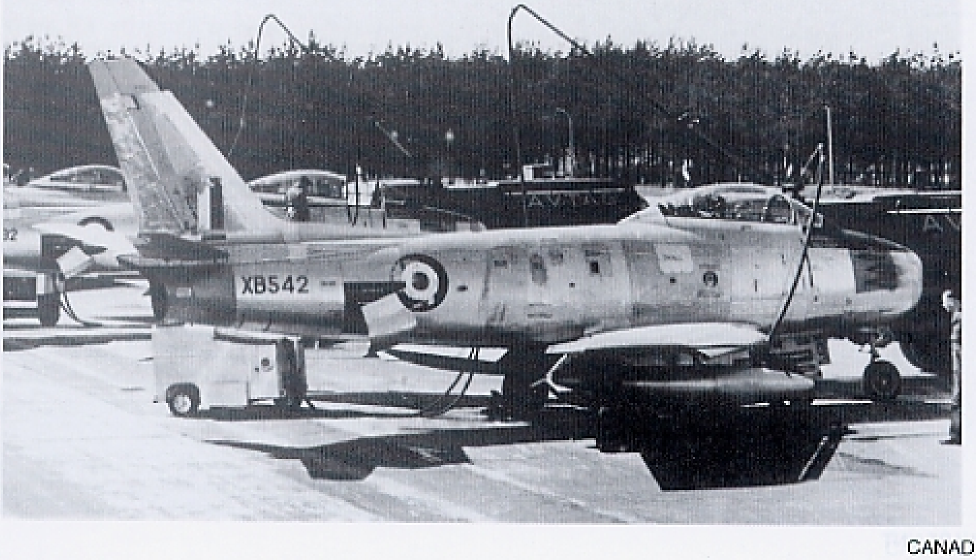
By the time the first production CF-104 flew on 26 May 1961 replacement of the Sabres was becoming a cause for concern. Increasing numbers of fatigue problems were becoming apparent and already all violent manoeuvres had been prohibited in an effort to extend the operational life of the remaining airframes for as long as possible. This effectively put an end to air-to-air combat training and much formation flying. Even once CF-104 production was under way the first aircraft went to 6 Operational Training Unit at Cold Lake, Alberta, so that instructor training and then pilot conversion could start, and it was not planned to deliver new aircraft to the front-line squadrons until 1963. The RCAF also ordered 14 two-seat CF-104Ds from Lockheed to assist in this training programme. In preparation for re-equipping with the Starfighter 427 Squadron at Zweibrucken disbanded in August 1962 and its personnel returned to Canada for conversion training. With this completed the squadron reformed with its new aircraft on 17 December and by the end of the year Starfighters were beginning to arrive in Germany aboard RCAF Hercules transports.

The squadron began operations at Zweibrucken early in 1963 and thereafter withdrawal of the Sabre was rapid. With the arrival of the Starfighter the role of 1 AD changed to that of nuclear strike and reconnaissance, and accordingly all the CF-100 squadrons were disbanded during the first half of 1963. At the same time the Starfighter force was to be concentrated in West Germany so the Canadians vacated both Grostenquin and Marville during the course of the year. When No.2 Wing disbanded its remaining units, 421 and 430 Squadrons, were reassigned to No.4 Wing and No.3 Wing respectively, but at Marville both the squadrons were eventually disbanded. The honour of being the last Canadian Sabre operator in Europe went to 439 Squadron which finally stood down on 14 November 1963 and by the end of the year 1 AD was fully operational with the Starfighter. The majority of the Sabre Mk.6s withdrawn were flown to Scottish Aviation's facility at Prestwick which for many years had been responsible for much of their routine overhaul and modifications, and during the course of the next few years all useful equipment was salvaged and the majority of the airframes scrapped.

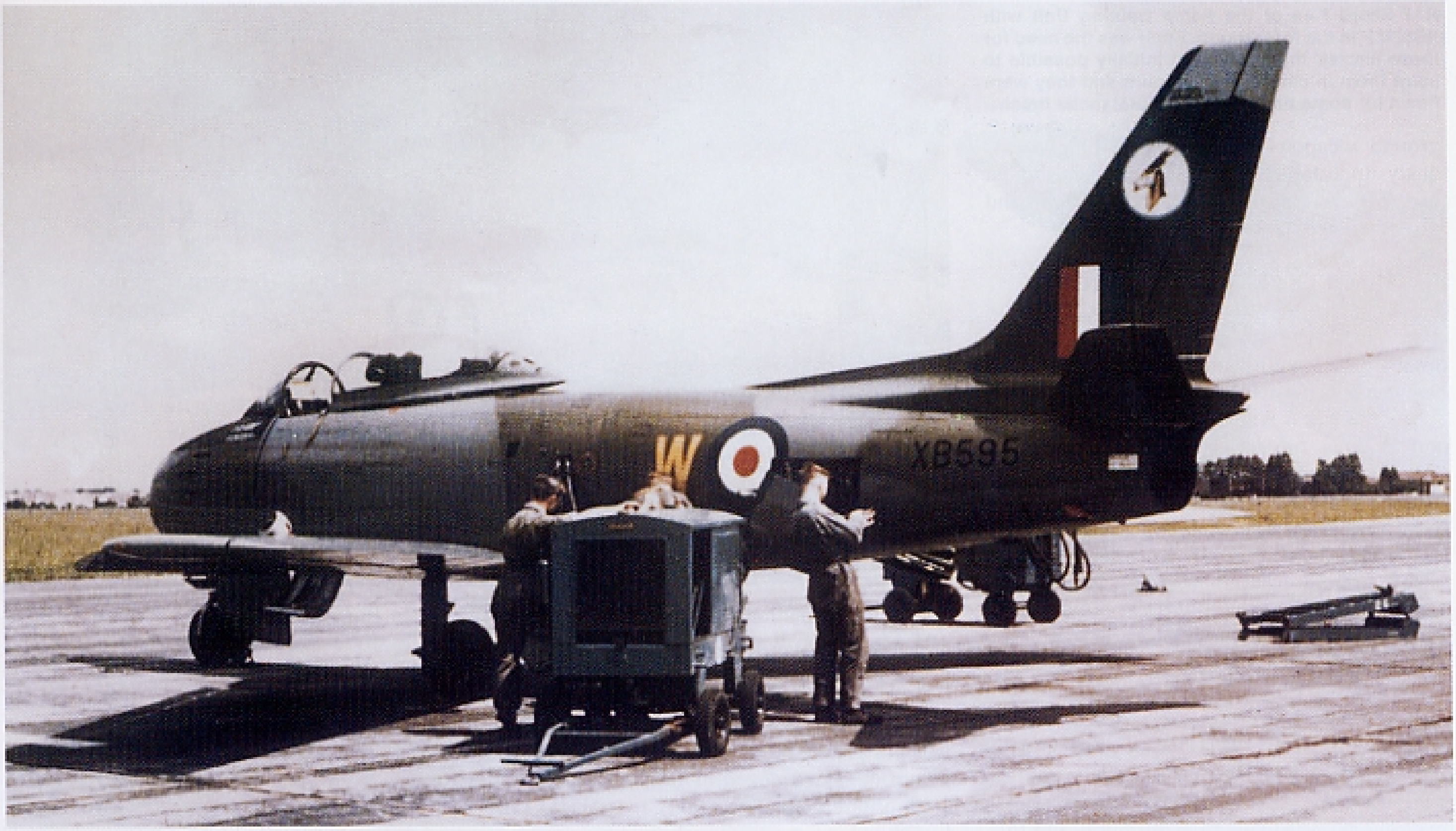
RCAF USE AT HOME

Whereas the Sabre had been used as an air defence fighter in Europe it had never been the intention to use it as such in Canada where air defence was provided largely by the CF-100 Canuck and F-101 Voodoo squadrons. Instead it was used mainly to train pilots destined for 1 AD, a task undertaken by No.1 (Fighter) Operational Training Unit (1 OTU) at Chatham, New Brunswick, which also became responsible for training the pilots from several foreign air arms destined to receive some of the former RCAF Sabres. This unit received its first Sabres in 1952 and thereafter used examples of all the operational versions until the advent of the Starfighter and the withdrawal of the Sabres from Europe. From then on 1 OTU continued to use the Sabre Mk.5 to give training in single-seat jet fighter operations and low-level tactical flying to pilots destined to fly the Starfighter, before they joined 6 OTU at Cold Lake. However, in late 1961 it was re-designated the Sabre Transition Unit to reflect its change in role and thereafter continued in the tactical jet conversion role until RCAF tactical training was reorganised in 1969. Preparatory to this the Sabres were officially retired from service on 29 November 1968 and the STU itself was disbanded at the end of the year. Thereafter future F-104 pilots undertook their single-seat tactical training on the CF-116s at Cold Lake. The remaining Sabre Mk.5s were then sent to Mountain View for storage, with the last being withdrawn in February 1969.

As the Sabre Mk.5s were withdrawn from Europe many were issued to RCAF Auxiliary Squadrons in the various Canadian provinces, beginning with 401 (City of Westmount) and



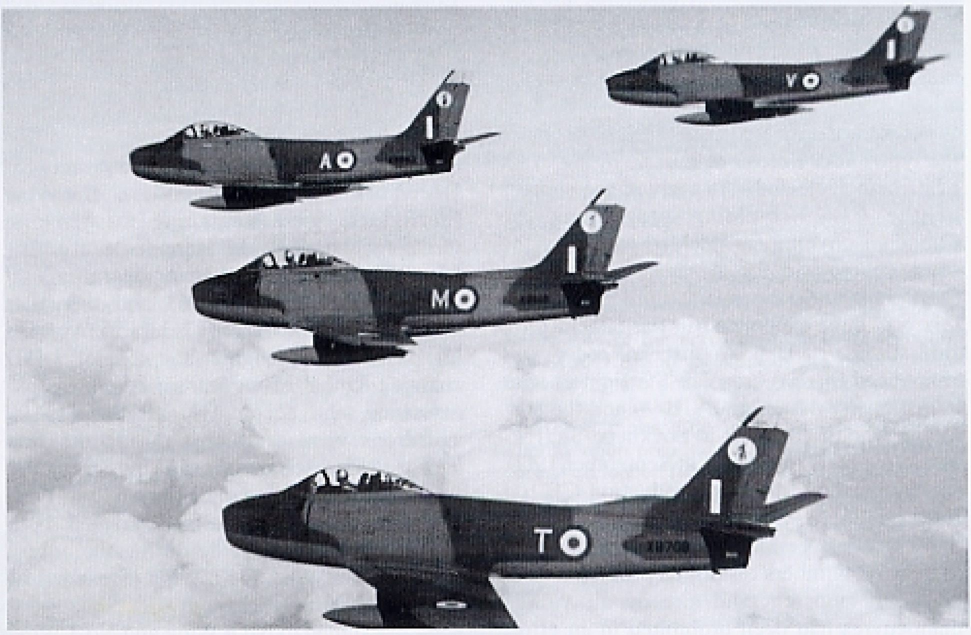
Four Sabre F.4s including XB542 and XB582 being refuelled at RAF Wildenrath, Germany.



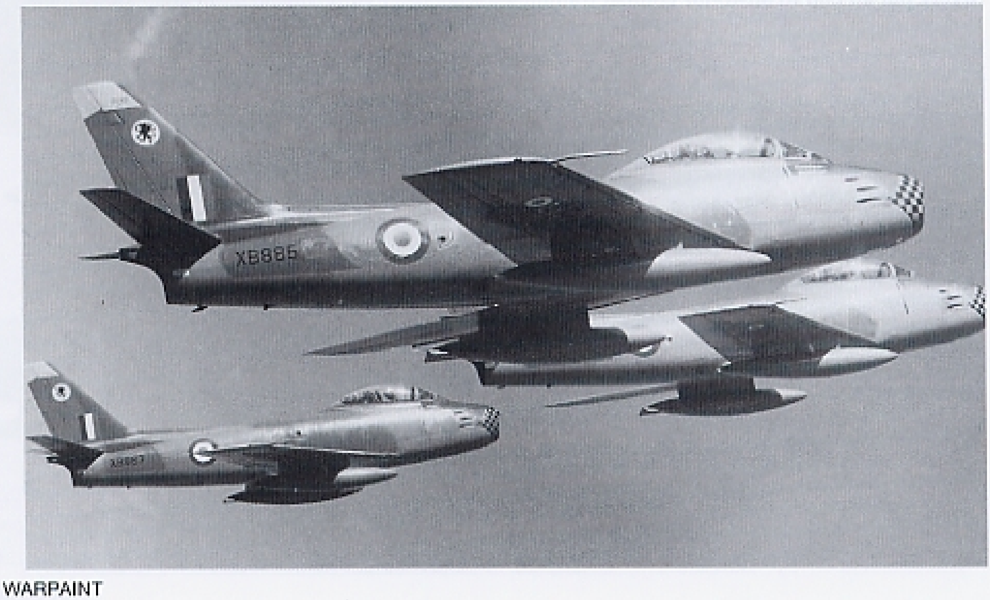
Sabre F.4 XB595:W of No. 26 Squadron based at Oldenburg being serviced when part of 2nd TAF, RAF Germany. (RAF Museum)

438 (City of Montreal) Squadrons at St Hubert, Quebec which were equipped initially with eight Sabre Mk.5s each from mid 1956. Other auxiliary units to receive the Sabre were 400 (City of Toronto) and 411 (County of York) Squadrons at Downsview, Toronto, and 442 (City of Vancouver) and 443 (City of New Westminster) Squadrons at Sea Island, Vancouver, British Columbia. These units gave RCAF reservists jet fighter experience as well as providing an extra fighter force for the defence of Canada in an emergency and remained active with the Sabre until 1958 when all these Auxiliary Squadrons were reassigned to the support role. A single regular squadron to operate the Sabre was 431 Squadron which reportedly used the type for a time to give pilots jet fighter experience before the unit converted to the CF-100 in 1954.

In 1959 the RCAF formed the 'Golden Hawks' display team at Chatham equipped with Sabre Mk.5s to commemorate the 50th anniversary of flight in Canada and the 35th anniversary of the formation of the RCAF. The first public display was given on 14 May the following year and although initially the team was to have operated for one year only, such was its success, particularly during displays given in the USA, that it was established on a permanent basis at RCAF Trenton. Eventually it re-equipped with Sabre Mk.6s and also received several CT-133s for training and support. It usually flew six Sabres with four operating as the main formation team and the other two flying as solo aircraft or as a synchronised pair. However, the 'Golden Hawks' team was eventually disbanded in about 1964 as part of an effort to reduce defence spending. Sabres were also used in small numbers by various station flights for high-speed communications and to give local pilots on non-flying tours of duty current fly-



Above: Another vew of No. 26 Squadron in formation. The antelope's head on the fin is clearly visible. (2nd TAF). Below: Three No. 234 Squadron Sabres based at Geilenkirchen, having red and black nose markings with a black dragon on a white disc on the fin. (2nd TAF)



Four No.92 Squadron Sabres from Linton-on-Ouse completing a loop, the nearest being XD719:T. Squadrom markings consisted of bars of red and yellow checks flanking the fuselage rondel and a yellow fin code letter. Being UK-based fighters they should all have had matt silver undersides but two appear to have PRU blue undersides probably indicating that they were former RAF Germany Sabres with serials in the XB range. (MoD)

ing practice. Other users of the type included the Central Experimental and Proving Establishment at Rockcliffe, Ottawa, and the National Aeronautical Establishment, which undertook various aircraft and systems trials and equipment evaluation. Canadair also used several Sabres for development flying during the type's period of service, as well as 23102 which was used as a chase aircraft for projects such as the CF-105 Arrow, and it was this aircraft which made the final Canadian military Sabre flight on 22 January 1970.

CANADAIR SABRES IN THE USA

The USAF operated F-86 Sabres in large numbers and many were deployed to south-east Asia during the period of the Korean War, including most of the F-86E-6-CANs built by Canadair. These were used alongside American-built Sabres by the 4th and 51st Fighter Wings in the Korean Theatre of Operations for air defence and armed tactical reconnaissance until after the cessation of hostilities. Thereafter the 4th Tactical Fighter Wing (TFW) moved around south-east Asia on air defence duties before returning to the USA to re-equip with F-100 Super Sabres in 1957, although by that time the war-weary Canadair Sabres had probably long since been withdrawn from use. In contrast 51st TFW received F-86Fs during the summer of 1954 and moved to Okinawa.

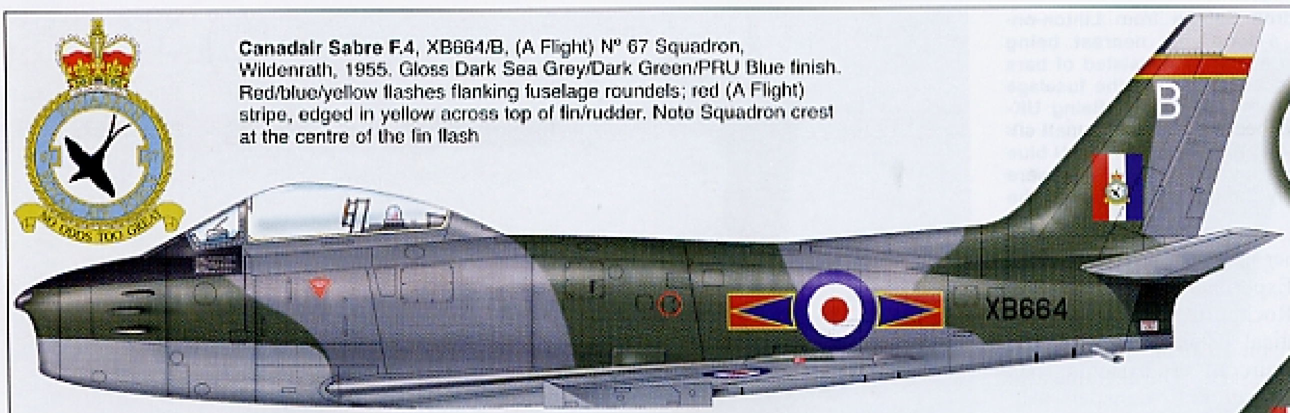
After the Korean War the large number of surplus Sabres on hand allowed the USAF to re-equip many fighter units of the Air National Guard (ANG) with this more up-to-date equipment. Like most auxiliary units the ANG fighter squadrons were primarily to provide a pool of reservists with current experience on modern jet fighters so that they could be deployed alongside the regular USAF squadrons in time of emergency, or act as additional air defence forces for the metropolitan USA if needed. Additionally, as the ANG came under the control of the State Governor the Sabres could be used as he saw fit, but hopefully the use of fighters on offensive operations within their home state would be a rare occurrence! Some 16 ANG fighter and fighter-bomber units operated the F-86E at various times between 1954 and 1959 but probably few of these received any of the ever-decreasing numbers of Canadian-built aircraft.

Sabre F.4 XD763:EWW when in use by Wing Commander Flying at Linton-on-Ouse (MAP)

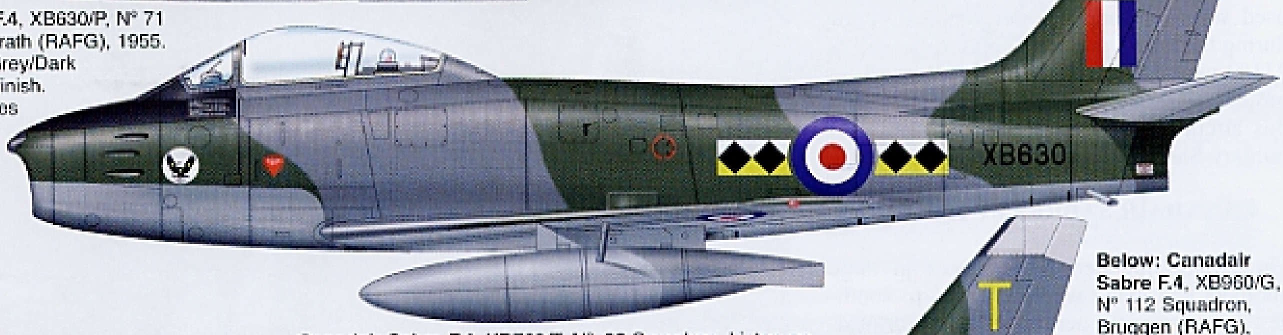
The phasing out of the RCAF Sabres fortunately coincided with a US Army Test and Evaluation Command requirement for a High speed target drone primarily for use on the White Sands Missile Range, a project that attracted the attention of Flight Sytsems Inc of Mojave, California. Out of the many redundant Sabre Mk.5s Flight Systems bought a large number to act as the basis for a remote controlled drone conversion and used for trials by the US Army in 1975 were probably converted at Mojave and which came to be designated the QF-86E-CAN. These aircraft were moved to Moncton in Canada where they were prepared for drone conversion and some actual conversion work was reportedly also carried out there. They were then sent in crates to Mojave where the drones were re-assembled, test flown then stored until required.

In all some 56 QF-86Es were produced and although most seem to have been operated carrying their former RCAF serial numbers all were allocated US civil registrations as well and many flew from Mojave with these markings at various times. Flight Systems acquired more Sabres than these and held them as spares sources for the repair of damaged drones and also to give a readily avail-

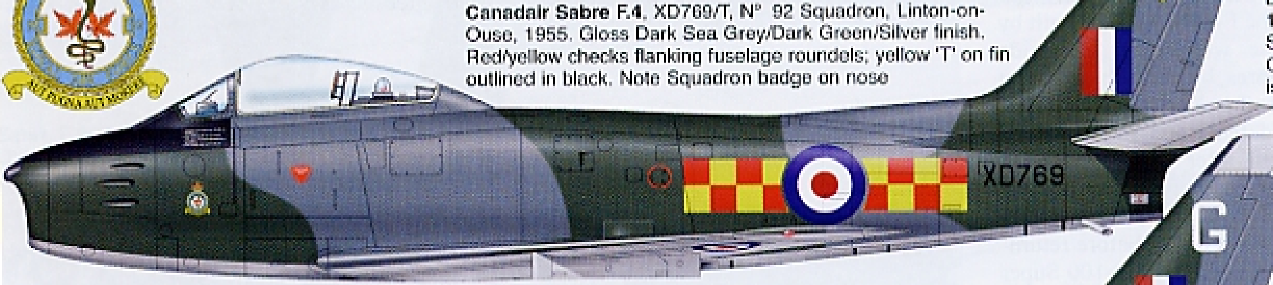
Canadair Sabre F.4, XB664/B, (A Flight) N° 67 Squadron, Wildenrath, 1955. Gloss Dark Sea Grey/Dark Green/PRU Blue finish. Red/blue/yellow flashes flanking fuselage roundels; red (A Flight) stripe, edged in yellow across top of fin/rudder. Note Squadron crest at the centre of the fin flash



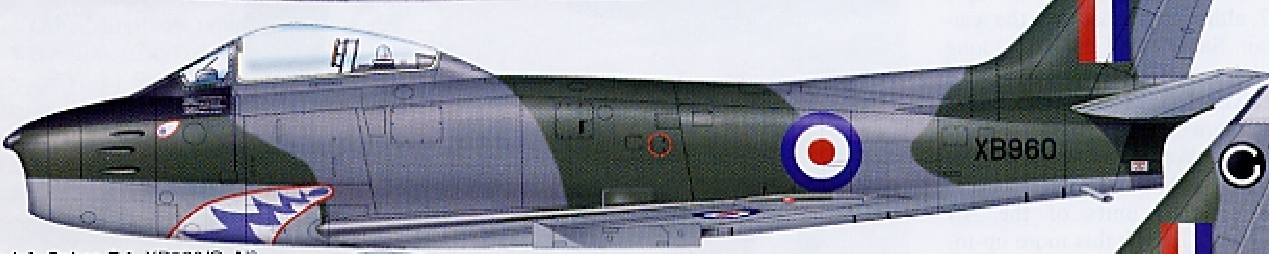
Canadair Sabre F.4, XB630/P, N° 71 Squadron, Wildenrath (RAFG), 1955. Gloss Dark Sea Grey/Dark Green/PRU Blue finish. Yellow/white flashes with black diamonds on fuselage; 'P' in yellow outlined in black.



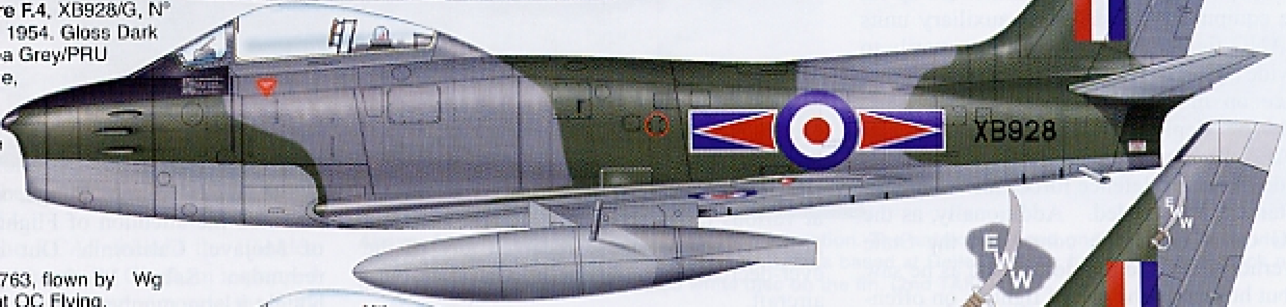
Canadair Sabre F.4, XD769/T, N° 92 Squadron, Linton-on-Ouse, 1955. Gloss Dark Sea Grey/Dark Green/Silver finish. Red/yellow checks flanking fuselage roundels; yellow 'T' on fin outlined in black. Note Squadron badge on nose



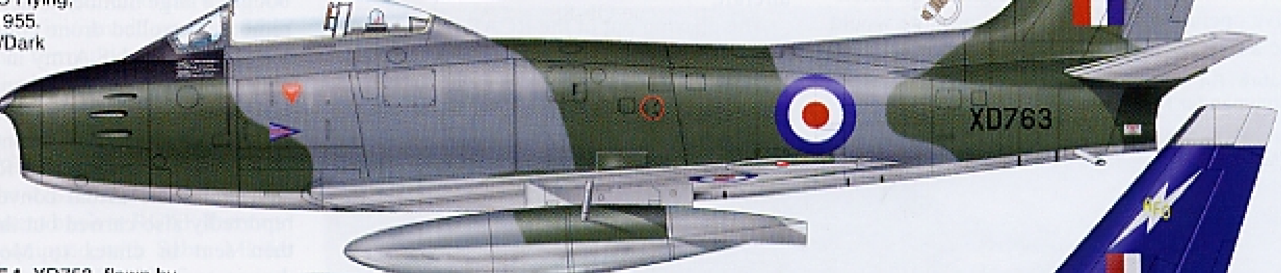
Below: Canadair Sabre F.4, XB960/G, N° 112 Squadron, Bruggen (RAFG), 1956. Gloss Dark Sea Grey/Dark Green/PRU Blue finish. White 'G' on fin.



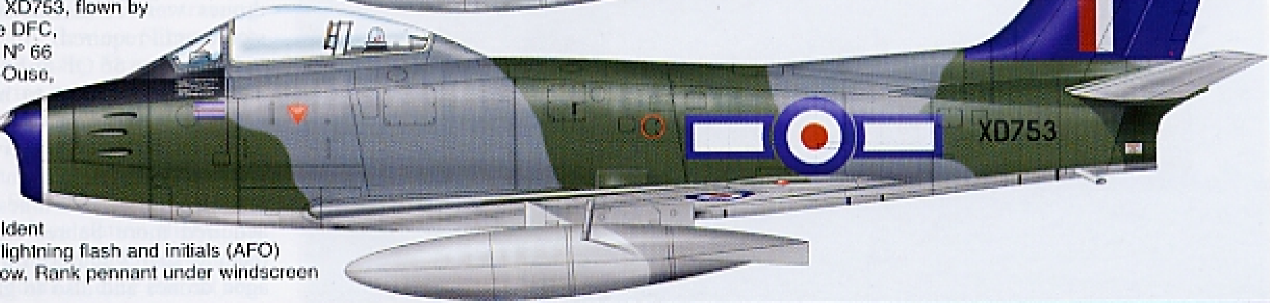
Canadair Sabre F.4, XB928/G, N° 130 Squadron, 1954. Gloss Dark Green/Dark Sea Grey/PRU Blue finish. Blue, white, red flashes on fuselage; white 'G' on a black disk on fin



Canadair Sabre F.4, XD763, flown by Wg Cdr E.W.Wright OC Flying, Linton-on-Ouse, 1955. Gloss Dark Green/Dark Sea Grey/silver underside finish with emblem on fin having initials in white. Rank pennant on nose under cockpit..



Canadair Sabre F.4, XD753, flown by Sqn Ldr A.F. Osborne DFC, Commanding Officer N° 66 Squadron, Linton-on-Ouse, 1956. Gloss Dark Sea Grey/Dark Green/Silver scheme. Ident Blue/white trim around nose and flashes on fuselage; Ident Blue fin with a white lightning flash and initials (AFO) superimposed in yellow. Rank pennant under windscreen

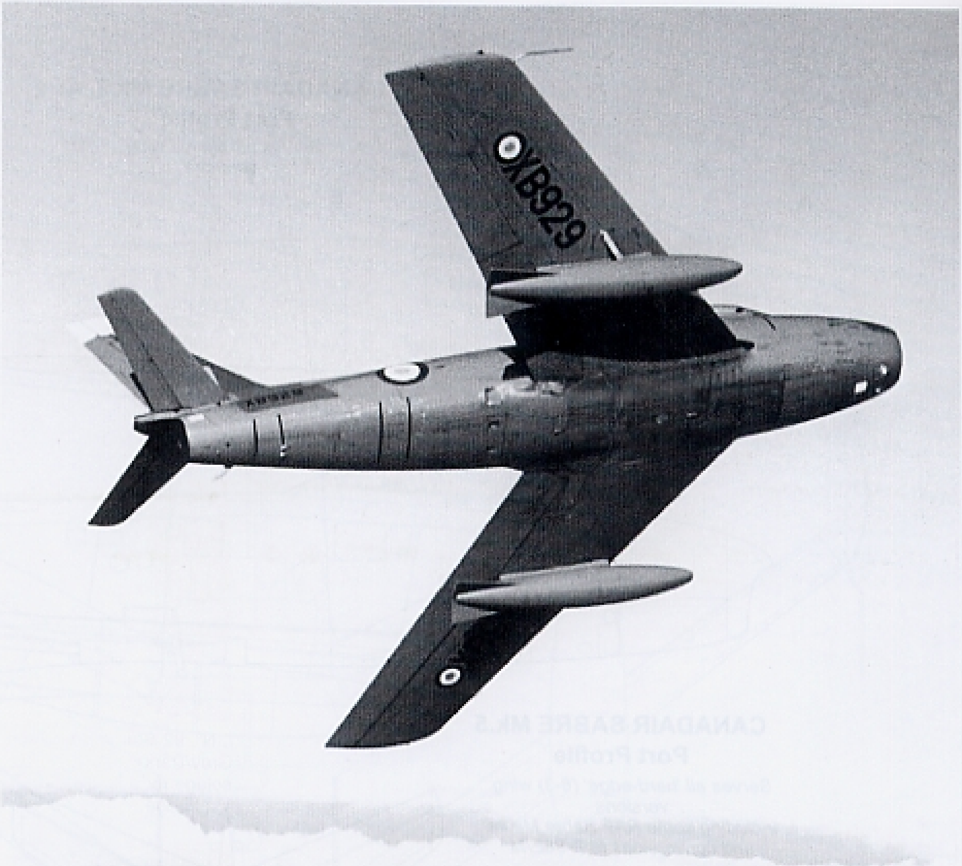


able pool of airframes should further drones be required. During the mid-1980s it was not unusual to see in excess of 30 Sabres stored outside at Mojave, although some of these may already have been converted and were awaiting their turn to be shot at.

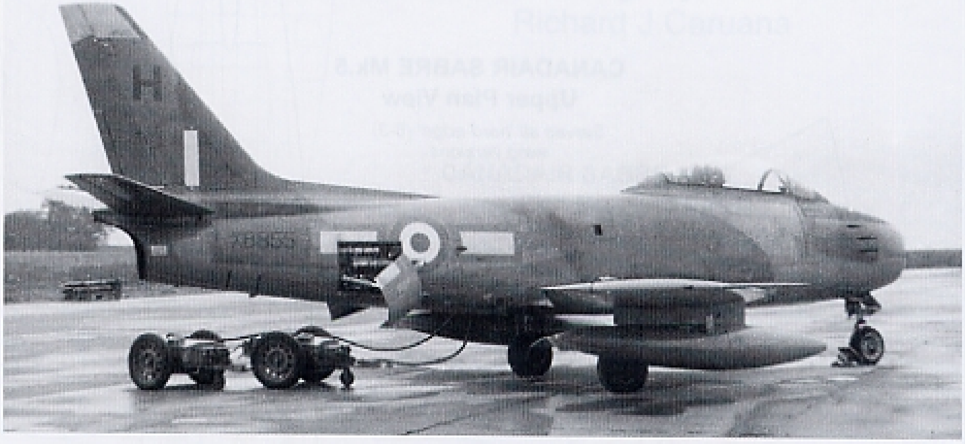
The conversion process consisted firstly of the removal of all unnecessary military equipment in order to reduce aircraft weight as much as possible. Then came the installation of the remote control equipment and aircraft systems' activator circuits, but the aircraft still had to be capable of being flown by an onboard pilot if necessary. The airframe also had to be fitted with data recording and transmission equipment as well as an emergency self-destruction system. In conjunction with the latter, two indicator lights were installed below the rear of the cockpit canopy, on the port side at least, one showing to outside observers when the system was 'safe' and the other when it was 'armed'. The underwing pylons and aircraft wiring also had to be modified to permit the carriage and operation of electronic warfare equipment mounted in pods, as well as infrared decoy flares and anti-radar chaff dispensers. At least some aircraft were fitted with oil tanks in the fuselage gun bays and internal piping to carry the oil into the exhaust pipe to generate a smoke trail to facilitate visual tracking of the drone. Probably radar echo enhancers and a locator beacon would also have been fitted, but the exact nature of the conversion work carried out remains unclear, and also whether all the drones were completed to the same standard, which seems unlikely. For example, some aircraft had their nose gun muzzles faired over with a single large plate, whilst others retained the original muzzle openings.

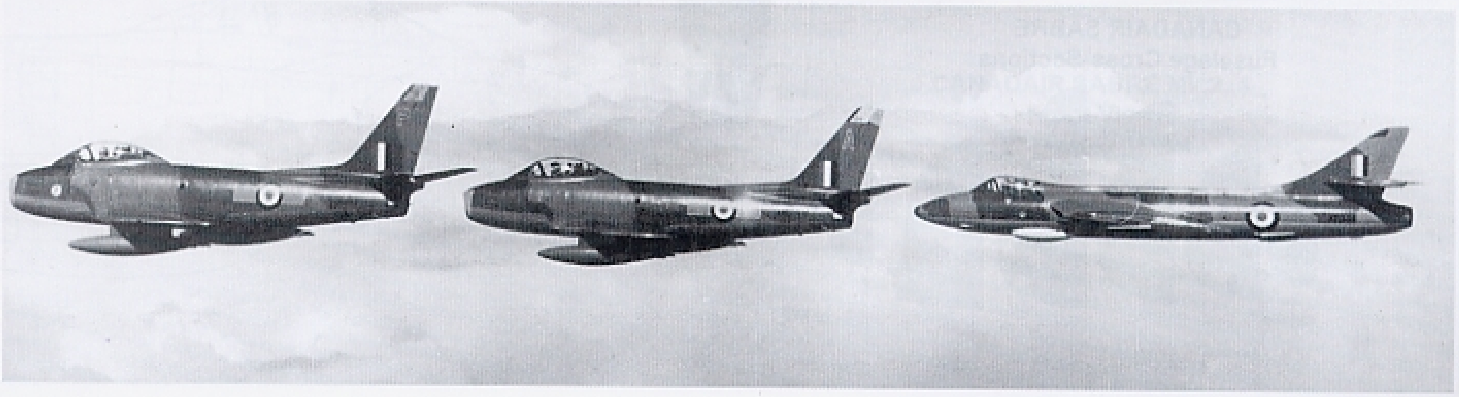
Deliveries to the US Army began in mid - 1977 and from October Flight Systems started its drone operations from Holloman AFB, New Mexico, as part of the USAF's 6585 Test Squadron. The QF-86Es were used on the nearby White Sands range as targets for USA anti-aircraft weapons then in use or under development such as the Patriot point defence missile system, or to evaluate foreign systems such as the French Roland. Drones were launched, and hopefully recovered, by ground controllers at Holloman, with transit control and control over the range being undertaken from mobile ground stations. Somewhat paradoxically, it was usually the intention not to shoot down the drone but to achieve a precomputed near miss so that pictures of the engagement and the recorded data could be recovered for analysis. Consequently by no means all of the QF-86Es were lost.

In 1981 Flight Systems took the opportunity of buying further redundant Sabres, this time about 10 Mk.6s from South Africa, but most of these were never needed and were eventually sold. By October 1984 50 QF-86Es had been delivered then, from the following year, the US Army began to acquire surplus F-100 Super Sabres for drone conversion, this work starting at Mojave in early 1985, and these eventually replaced the QF-86Es. Flight Systems began to dispose of its surplus F-86s during the late 1980s although the US Army drone programme did not formally end until June 1996 when the Holloman

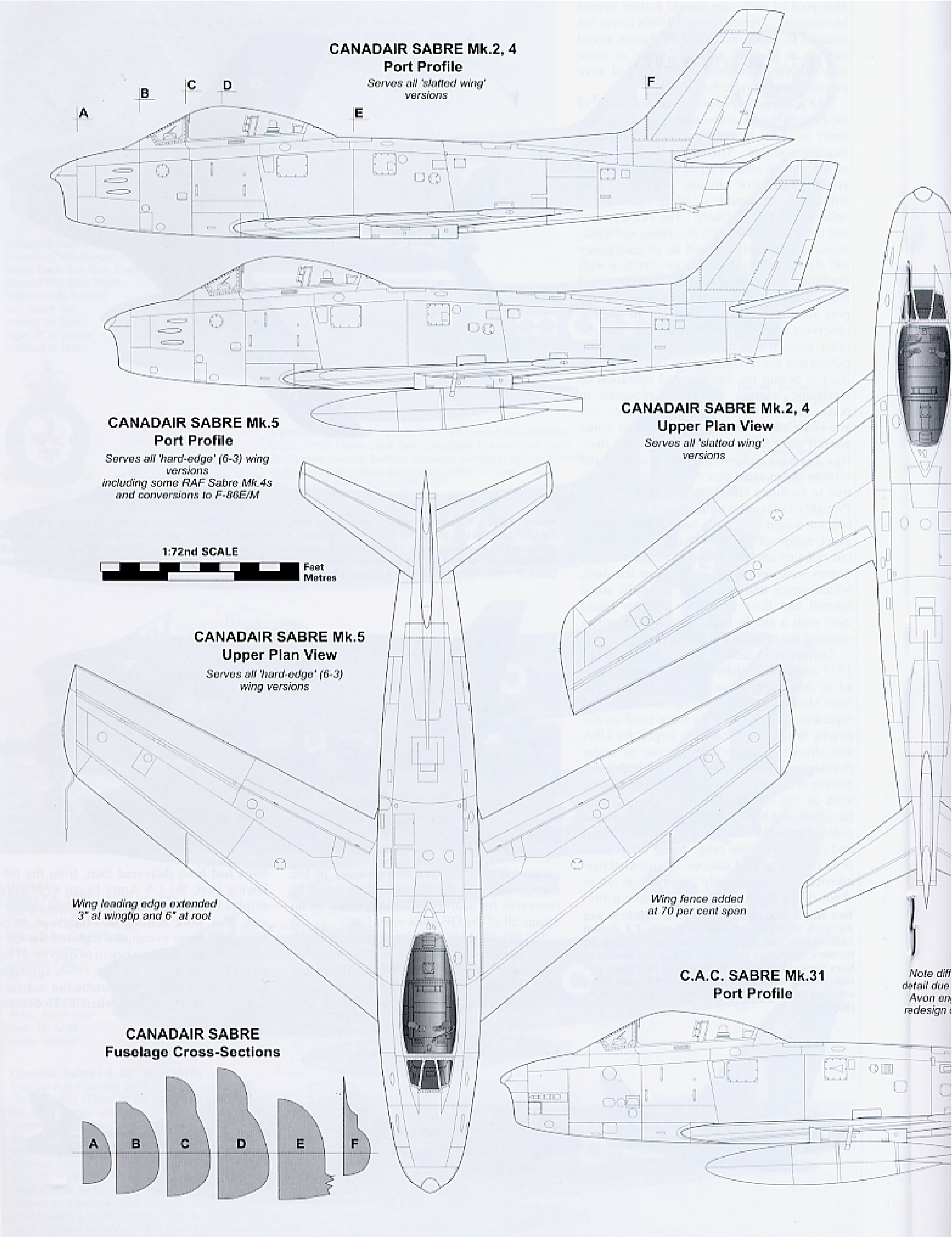


Above: XB929, a Sabre F.4 which went on to serve with No. 130 Squadron. Evident in this angle are the smaller underwing roundels and the compact presentation of the serial number so that it was not obscured by the drop tank. The starboard wing tip pitot mast has a kink at the root which was a modification incorporated on many Sabres. Below: Sabre F.4 XB855 of No.66 Squadron based at Linton-on-Ouse in 1954. (Tony Wilson via Roger Lindsay)





Two No. 3 Squadron Sabre F.4s, XB640:P and XB749:A in company with a Hunter F.4 during 1955 when the squadron was converting to Hunters. Markings consisted of a green nose and bars flanking the roundel all edged in golden yellow. XB640 also has the squadron's cockatrice emblem on a white disc on the forward fuselage. (MoD)



CANADAIR SABRE Mk.2, 4
Port Profile
Serves all 'slatted wing' versions

CANADAIR SABRE Mk.2, 4
Upper Plan View
Serves all 'slatted wing' versions

CANADAIR SABRE Mk.5
Port Profile
Serves all 'hard-edge' (6-3) wing versions including some RAF Sabre Mk.4s and conversions to F-86E/M

CANADAIR SABRE Mk.5
Upper Plan View
Serves all 'hard-edge' (6-3) wing versions

Wing leading edge extended 3" at wingtip and 6" at root

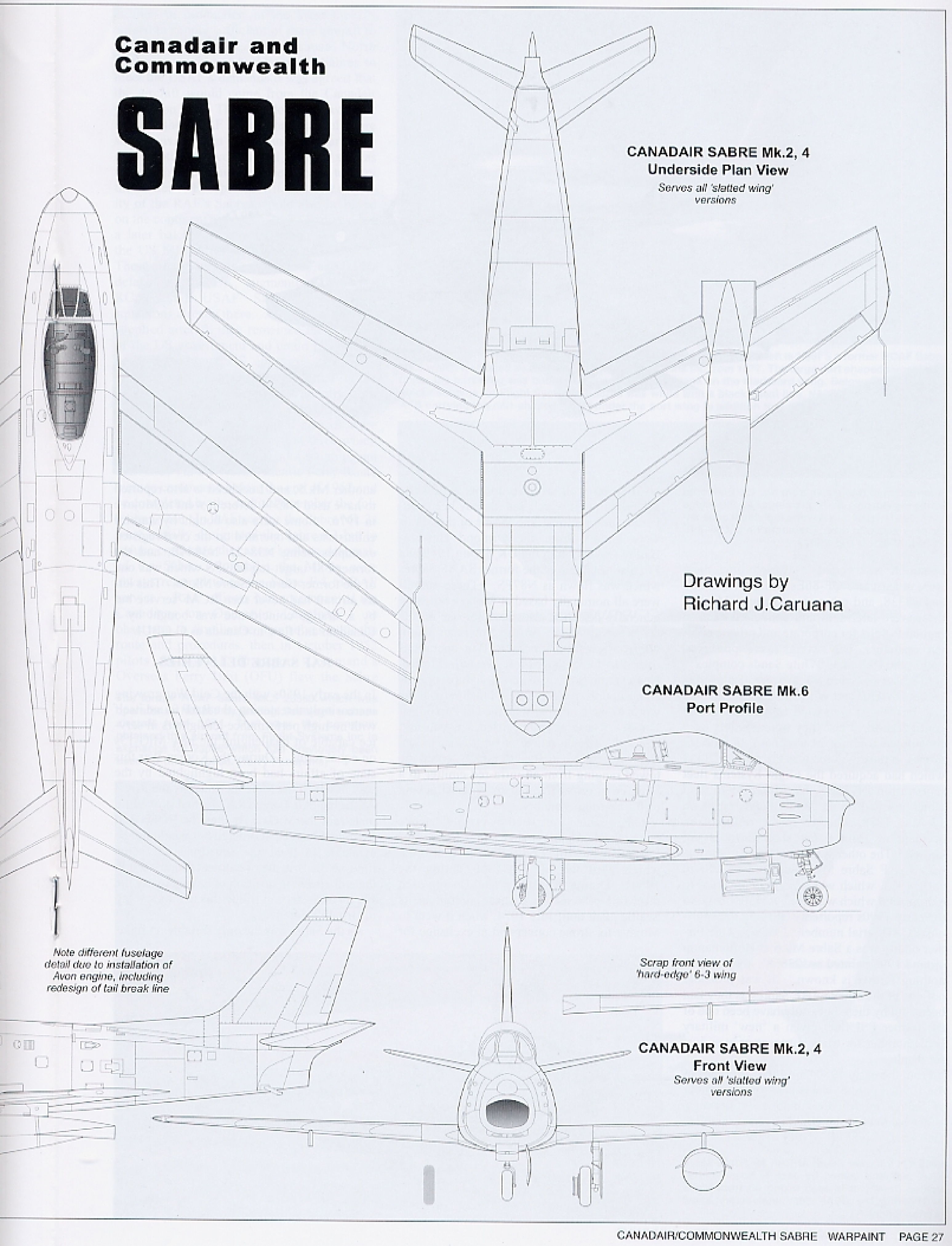
Wing fence added at 70 per cent span

C.A.C. SABRE Mk.31
Port Profile

Note diff
detail due
Avon en
redesign

CANADAIR SABRE
Fuselage Cross-Sections

Canadair and Commonwealth
SABRE



CANADAIR SABRE Mk.2, 4
Underside Plan View
Serves all 'slatted wing' versions

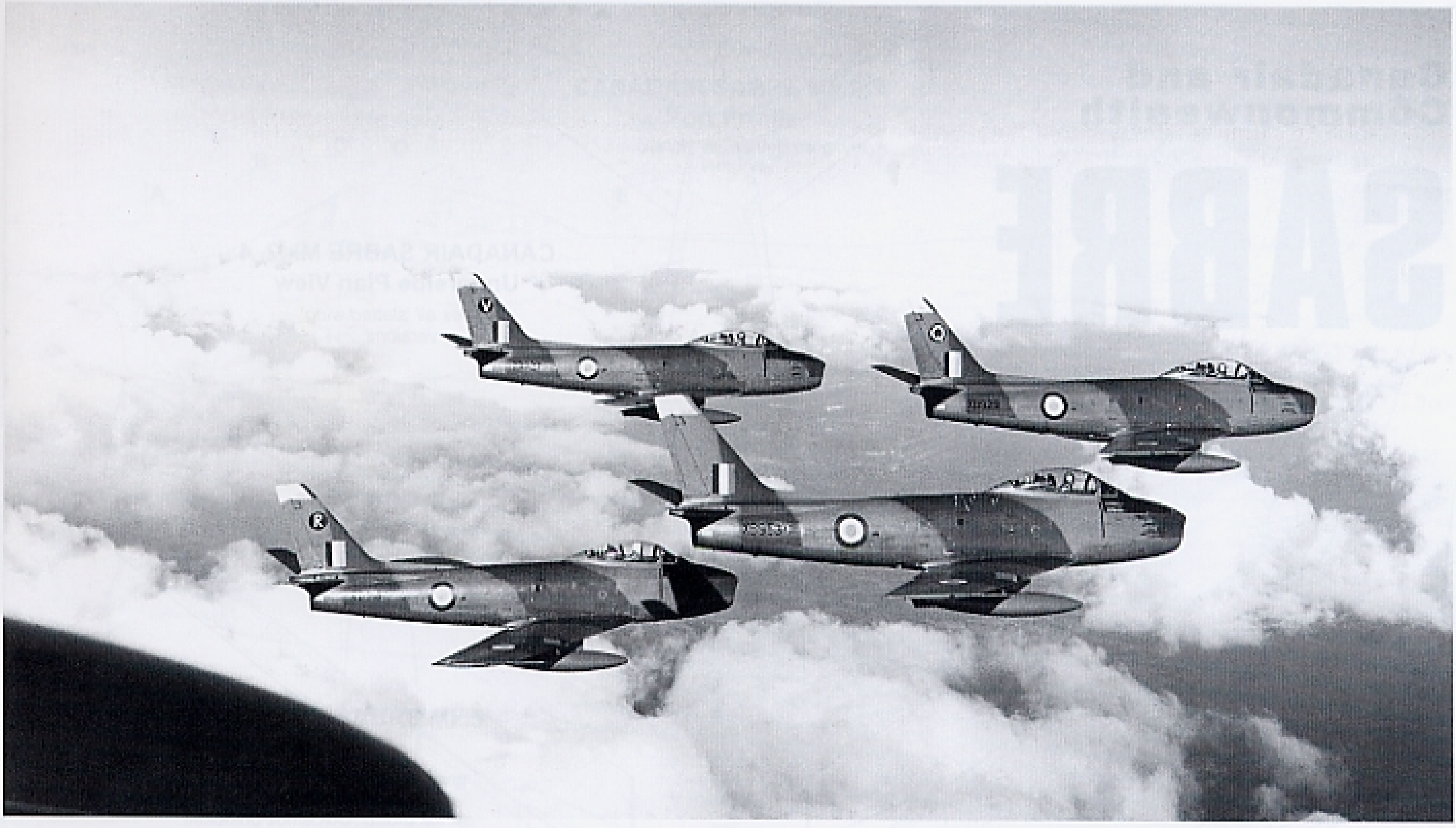
Drawings by
Richard J.Caruana

CANADAIR SABRE Mk.6
Port Profile

Note different fuselage detail due to installation of Avon engine, including redesign of tail break line

Scrap front view of 'hard-edge' 6-3 wing

CANADAIR SABRE Mk.2, 4
Front View
Serves all 'slatted wing' versions



A formation of Sabre F.4s from No. 130 Squadron in the squadron's early markings. At this stage they consisted of only a white individual code letter on a black fin disc. The aircraft are XB918:R, XB953, XB929:Q and XB927:V.

operation was ended, at which time there were at least two QF-86Es still active, 23300 and 23338, and others in storage. Most of these were later sold and converted back to regular F-86Es for corporate and private civilian operators, but several were preserved within the Holloman/White Sands complex.

At least two Sabre Mk.6s were also used at Holloman AFB and White Sands. These may also have been converted to a hybrid drone configuration, or else they were possibly used for piloted trials or as shepherd aircraft for drones in transit. One was the former 23454 which had acquired the Flight Systems fleet registration N186FS by about 1976 and which crashed on the White Sands range on 17 May 1978, whether as the result of an accident or from being shot down is not known. The other was N3841V, the first former SAAF Sabre Mk.6 acquired by FSI in early 1983, which was possibly converted to a drone and which was used at Holloman into the early 1990s reportedly carrying the spurious RCAF serial number '23669'. One further oddity was a Sabre Mk.6 at Holloman in around 1996 painted as '23668', about which nothing further is known. It was probably not one of the other SAAF Sabres as they had been sold by then, but could have been one of the former FSI fleet given a 'new' military serial number for trials purposes or even just for display.

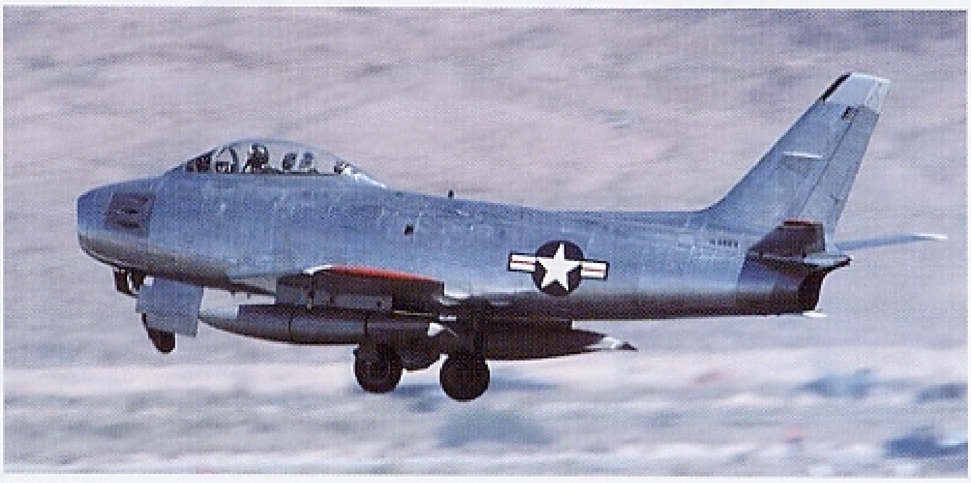
From the early 1980s until the latter part of the 1990s Flight Systems also used a number of Sabres modified as manned target-tugs, under contract to the USAF. These included the Mk.5s N86FS, N91FS, N92FS and N93FS, as well as five former Luftwaffe Mk.6s, some of which had already been converted for target-towing. Some of the Mk.6s were bought from the Ormond Haydon-Baillie Collection in the UK during 1979 and FSI also used one of the former SAAF Sabres which was flown as N87FS. These aircraft were all nominally based at Mojave but were generally detached elsewhere for use on the US weapons ranges in the American southwest, or flew from Tyndall AFB on operations over the Gulf ranges off western Florida. However, they are also known to have operated in support of US forces in other parts of the world as well, notably with the US Pacific Air Force. These aircraft carried a winch unit under the after fuselage or on a wing pylon, from which a variety of targets could be towed ranging from an infra-red emitter to a large cruciform dart used for target tracking or for air-to-air gunnery.

Other Sabres were used by private defence research companies such as Flight Test Research Inc. of Long Beach, California which used the Mk.6 N186F during the 1960s. During the same period Boeing used the Mk.5 N8686F as a chase aircraft at its Seattle plant until July 1974, when it went to Mojave for drone conversion in exchange for another Mk.5, and Lockheed is also reported to have used N8544 before it went to Mojave in 1976. Some were also bought by warbird enthusiasts and operated on the civil register, examples being N3842J, N3844E, and the former FSI target-tug N89FS which was one of the former German Sabre Mk.6s. This latter aircraft had never seen RCAF service but by a strange coincidence was bought by a Canadian and flew in Canada as C-GBUI.

RAF SABRE DELIVERIES

In the early 1950s with the Cold War growing increasingly threatening, the RAF found itself with no high performance jet fighters in service capable of challenging the new MiG-15s on equal terms. During the Korean War this state of affairs had been highlighted by the way in which the Meteors flown by the Royal Australian Air Force (RAAF) had proved no match for the MiGs. By then the Hunter and Swift had both been ordered but would not be available to front-line squadrons for some time, so the British government found itself in the embarrassing position of having to ask the US for assistance in filling this temporary gap in Britain's defences.

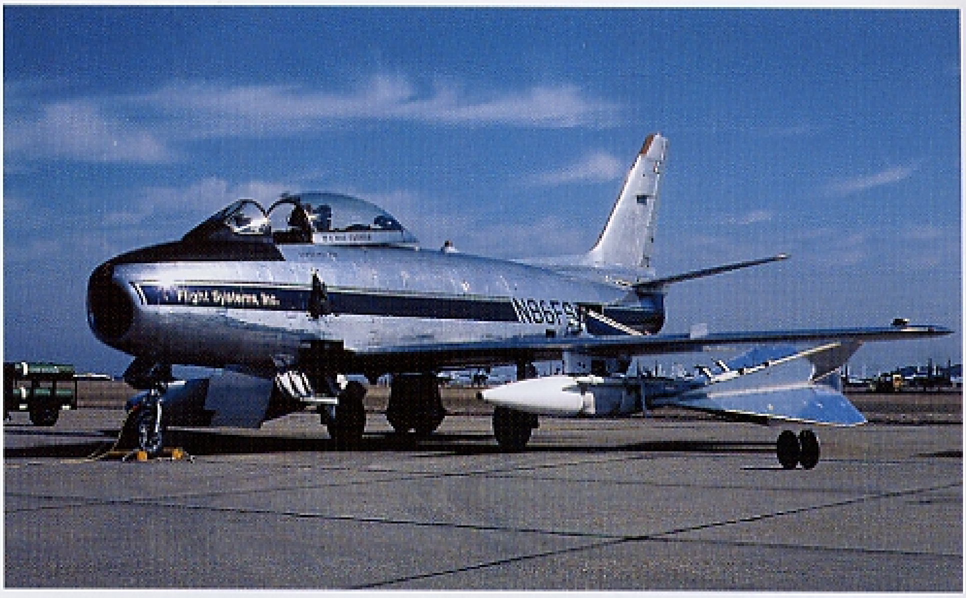
As the Sabre was the only suitable jet fight-



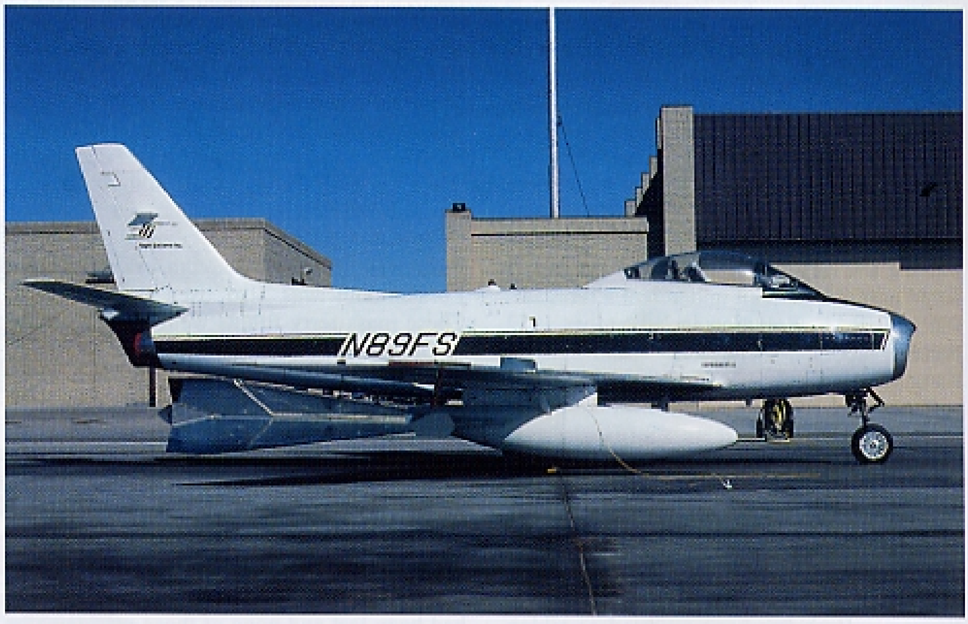
N86EX is a former South African Air Force Sabre Mk.6 '380' and owned by Jack M.Rosamond at Golden County. It is seen taking off from Nellis AFB during the USAF 50th anniversary show (Adrian Balch)

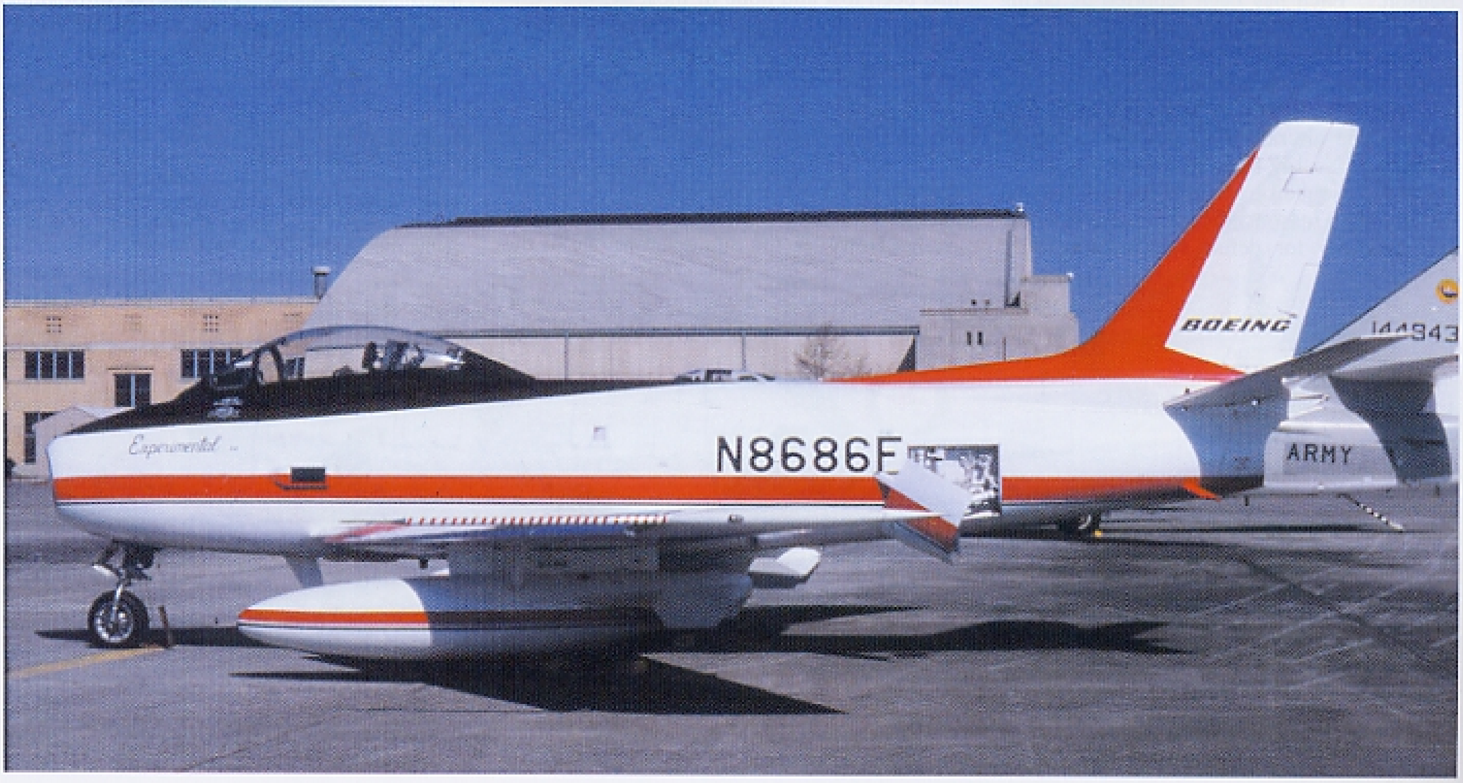
er then in production in the West the US agreed to supply sufficient of these aircraft to fill Britain's needs, but because North American could not build enough Sabres to meet the USAF's demands it was agreed that the aircraft would come from the Canadair production line. This was doubly convenient because the RCAF already had several Sabre squadrons based in Britain and was starting to deploy others to continental Europe, so was setting up an organisation specifically to ferry the Sabres to Europe via Britain. The majority of the RAF's Sabres would also be based on the continent as part of RAF Germany, but a later batch was specifically funded under the US MDAP for RAF Fighter Command. These aircraft were to remain in Britain for air defence of the UK, augmenting the other RCAF and USAF Sabre air defence squadrons already there. As with all MDAP-supplied aircraft, they remained the property of the US government and could not be disposed of without US approval, effectively meaning that when no longer required for the purpose for which they had originally been supplied they had to be returned to US charge.

All of the MDAP-funded aircraft were Sabre Mk.4s except for the first three which were to be Mk.2s for use in pilot training, and deliveries via the North Atlantic Ferry Route were to commence before the end of 1952 and be completed by the end of December the following year. In RAF service the Sabre Mk.2s were initially designated the Sabre F.1 but to reduce confusion they were soon re-designated the Sabre F.2, whilst the Mk.4s were always referred to as the Sabre F.4 in RAF service. RAF officers had accompanied the Canadians on Operation Leapfrog 1 as observers to familiarise themselves with the route and procedures, then in October 1952 pilots from RAF Transport Command's Overseas Ferry Unit (OFU) flew the Sabre

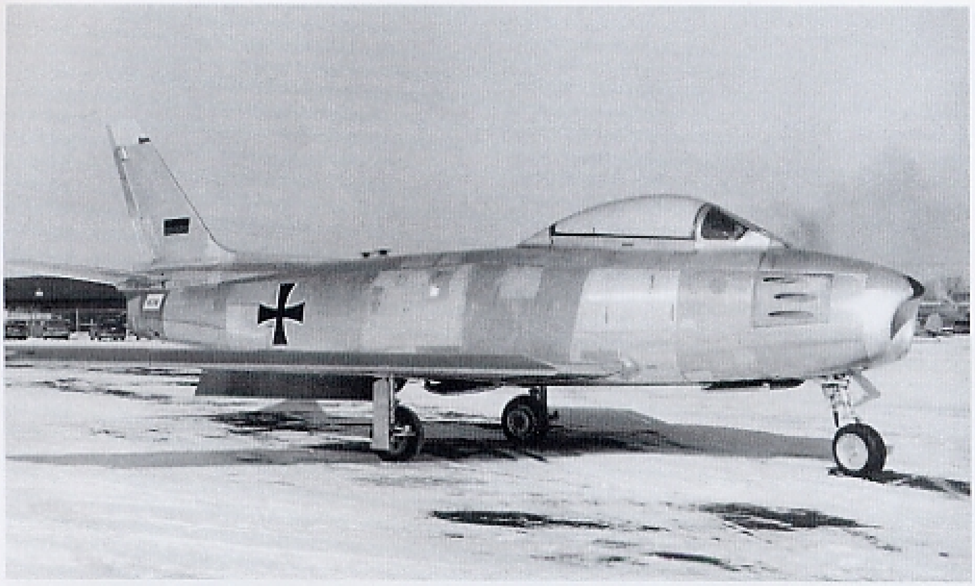


Above: Shown in its original natural metal and dark blue cheat line finish is N86FS a former RCAF Sabre Mk.5 which was used as a target tug by Flight Systems Inc from 1977. The large dart shaped target body under the port wing was counterbalanced by a drop tank on the starboard wing. Below: The definitive-colour scheme for Flight System's Sabres was white with a black cheat line. N89FS was in use at Luke AFB carrying the dart-shaped target under the port wing in addition to a drop tank. (Terry Panapolis)





The former RCAF Sabre Mk.5 23363 which was operated as N8686F by Boeing, Seattle as a chase aircraft from 1974. That year the company obtained this aircraft from Flight Systems Inc in exchange for 23096 which had previously been used for this purpose. (Terry Panapolis)



The 66th production Canadair Sabre Mk.6 (c/n 1656) for the Luftwaffe seen at Cartierville awaiting delivery. It made its first flight on 9 January 1958 and was eventually transferred to the Pakistan Air Force. (Terry Panopalis)

F.2s XB530-532 to Prestwick, Scotland as part of the Leapfrog 2 deployment. These were destined for the Ferry Conversion Unit (probably a part of the Ferry Training Unit based at RAF Abingdon) which formed at RAF North Luffenham within No 1 Wing, RCAF, for the purpose of training the necessary OFU pilots who would then ferry the remaining RAF Sabres across the Atlantic. When no longer required for pilot training the Sabre F.2s were returned to the RCAF or otherwise disposed of, to be replaced by Sabre F.4s.

Since these RAF aircraft were to be ferried into the UK rather than out of it as the OFU's name implied, the unit underwent a reorganisation at RAF Abingdon in November 1952 dividing up to become Nos. 1 and 3 Long Range Ferry Units. By the end of the year sufficient RAF pilots had converted to the Sabre at North Luffenham for the FCU to move to RAF Abingdon and merge with No.1 LRFU which then began a move to RAF Benson. However, the following February each Ferry Unit was given squadron status and became Nos.147 and 167 Squadrons respectively, and by that April both were at Benson. Each has been reported as taking part in ferrying the Sabres to the UK but other sources credit the delivery flights to No.147 Squadron only, this confusion probably being due to the similarity in the squadrons' numbers. The aircraft were nominally on the strength of No.147 Squadron whilst on delivery and the squadron retained some at Benson for unknown reasons after their arrival in the UK, possibly for defect rectification work before passing them on to their assigned unit.

The first batch of 12 RAF Sabre F.4s left RCAF Bagotville, Quebec on 8 December 1952 for Prestwick, and from there were dispersed to various maintenance facilities around the UK to be prepared for RAF service. Before long the Canadian departure airfield was changed to RCAF St Hubert, Montreal where it was easier for the delivery pilots to practise flying the Sabre, and as Prestwick was a civil airport it was decided to make the UK destination a military airfield. Accordingly RAF Kinloss, a Coastal Command airfield on the shore of the Moray Firth was selected, although nearby RNAS Lossiemouth was also used on occasions. These mass ferry flights went under the title of Operation Becher's Brook, named after the famous water jump on the Grand National race course at Aintree, and whenever possible the RAF movements were co-ordinated with similar ferry flights of Canadian or USAF Sabres. By the time the last ferry flight landed on 19 December 1953, No.147 Squadron had undertaken ten such massed crossings with the largest numbering some 54 aircraft. During the entire operation only five aircraft had been lost and none of those was actually during the Atlantic phase of the crossing.

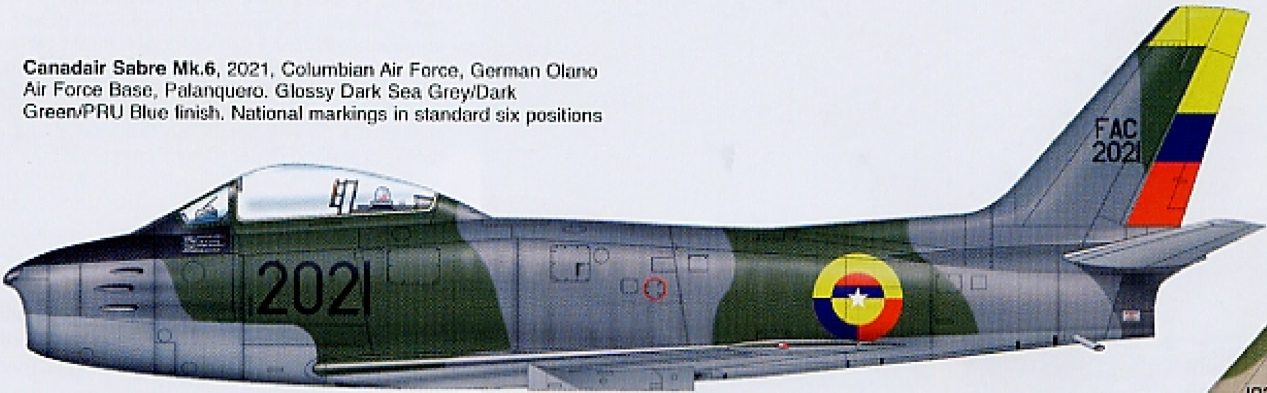
RAF SERIAL NUMBERS

The Sabres supplied to the RAF all carried RAF serial numbers from delivery even though they were all allocated RCAF serials and, in some cases, USAF serial numbers as well. However, the Sabre shows one of the rare instances in the allocation of British serial numbers when errors were made resulting in numbers being duplicated, and also where certain aircraft were given new numbers for a specific purpose.

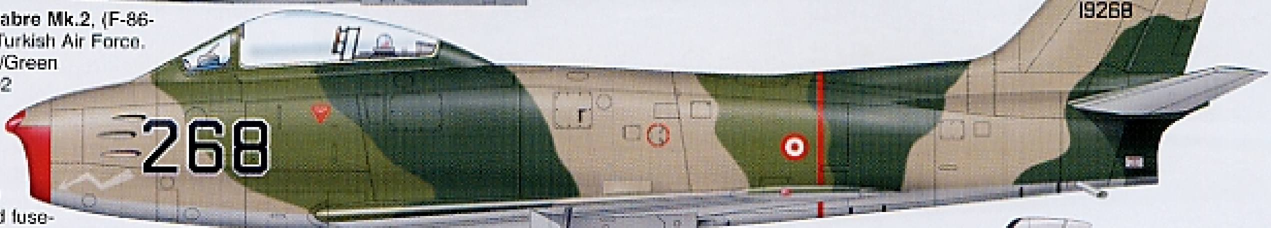
As initially allocated the Sabre Mk.2s and Mk.4s had the numbers XB530-550, XB575-603, XB608-646, XB664-713, XB726-769, XB790-839, XB856-905, XB941-990, XD102-144 and XD167-210. However almost immediately the last 50 aircraft from XD139 on were deleted as they were not required by the RAF. These Sabres were then followed by a further 60, XD707-736 and XD753-781, which were supplied under US MDAP for the specific use of Fighter Command and consequently these were also allotted USAF serial numbers. At about this time it seems to have been decided that in order to make it clear which aircraft were to be used in Germany and which in the UK, the former would have the 'XB' serial prefix and the latter the 'XD'. Accordingly the aircraft with the 37 numbers XD102-138 were given 'XB' numbers from the unassigned 'black-out blocks' between the other 'XB' Sabre serial numbers. This worked as far as the numbers XB647-650, XB770-775 and XB851-855 were concerned, but for some reason the last 22 aircraft were given the numbers XB978-999 which compromised 13 serial numbers already carried by other Sabres!

Further confusing the issue, in September 1953 55 Sabres from the original 'XB' prefix serial allocation were for some reason also given new numbers, again with the 'XB' prefix, but this did make it possible to resolve the problem of the duplicated Sabre serial numbers. Not all of these new numbers were taken up, perhaps because the aircraft had already been lost in an accident. There was also one new serial number allocated, this being XB551 which was an extra Mk.4 delivered to replace the Mk.2 XB530 which was returned to Canada. Perhaps not surprisingly, some numbers from the XD753-781 block were erroneously assigned to other types ordered later, but in this case the Sabres had

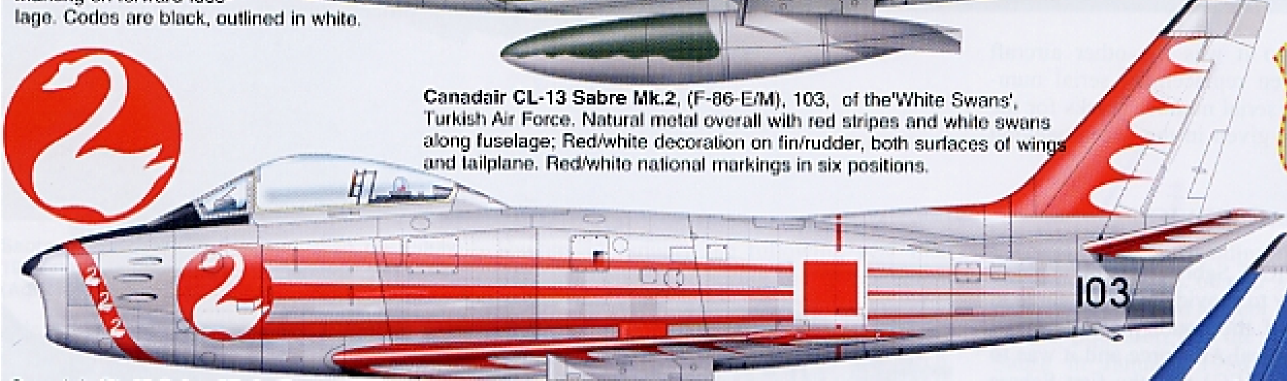
A rare picture of 438 Squadron Sabre Mk.5s at RCAF St.Hubert in 1957. From left to right the aircraft are 23052, 23304 and 23206 and all have red wing outer panels and centre tailplane area, together with a large panel at the bottom of the fin below the rudder. (Terry Panopalis)



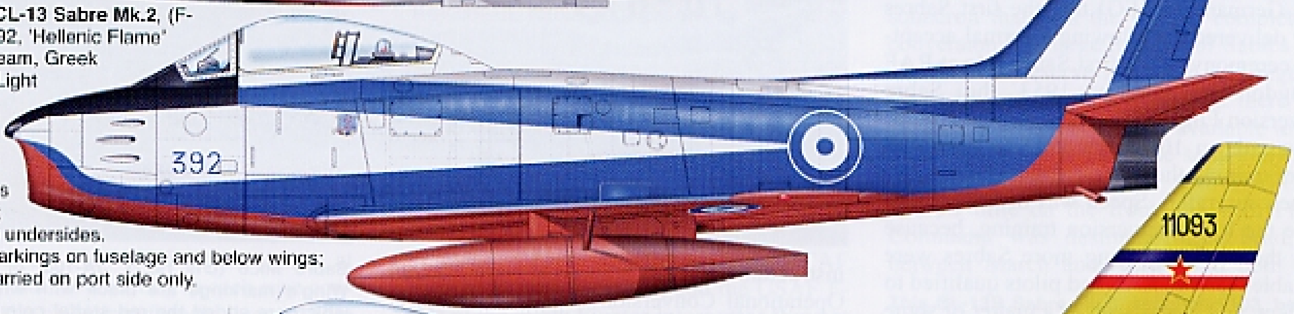
Canadair Sabre Mk.6, 2021, Columbian Air Force, German Olano Air Force Base, Palanquero. Glossy Dark Sea Grey/Dark Green/PRU Blue finish. National markings in standard six positions



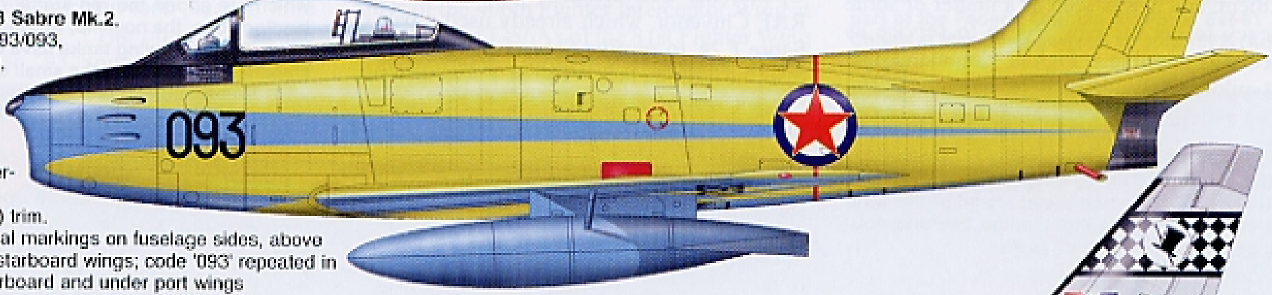
Canadair CL-13 Sabre Mk.2, (F-86-E/M), 19268/268, Turkish Air Force. Special Tan 20400/Green 34079/Green 34102 upper surfaces; Underside Gray 36622. Red areas around air intake and light tan arrow marking on forward fuselage. Codes are black, outlined in white.



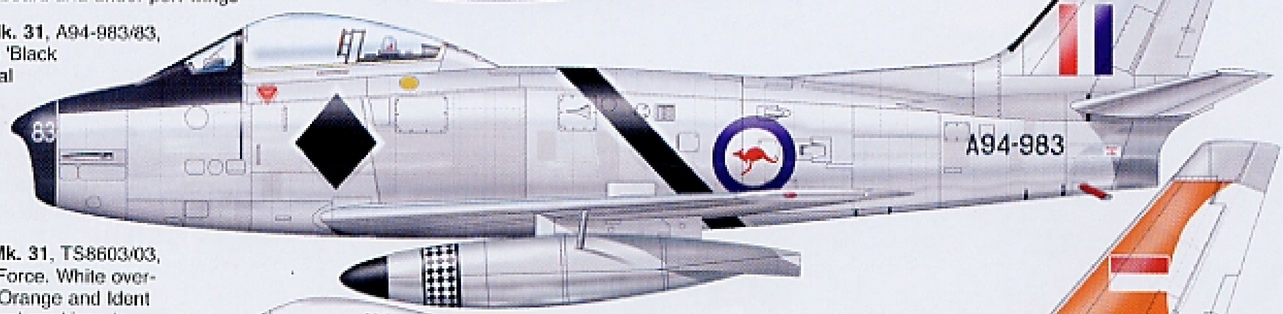
Canadair CL-13 Sabre Mk.2, (F-86-E/M), 103, of the'White Swans', Turkish Air Force. Natural metal overall with red stripes and white swans along fuselage; Red/white decoration on fin/rudder, both surfaces of wings and tailplane. Red/white national markings in six positions.



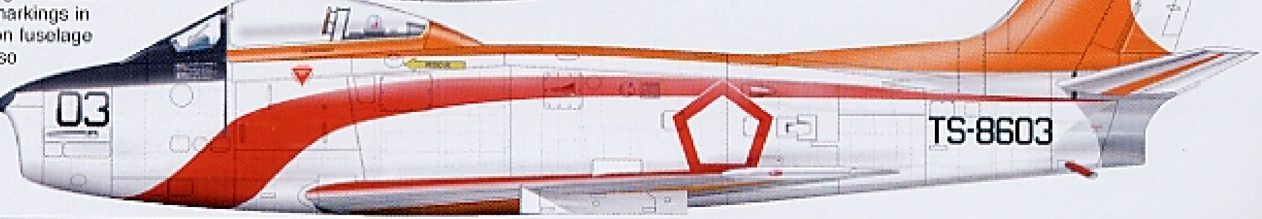
Canadair CL-13 Sabre Mk.2, (F-86-E/M), 392, 'Hellenic Flame' aerobatic team, Greek Air Force. Light blue and white fuselage sides and top of wings & tailplane; red-orange undersides. National markings on fuselage and below wings; badge is carried on port side only.



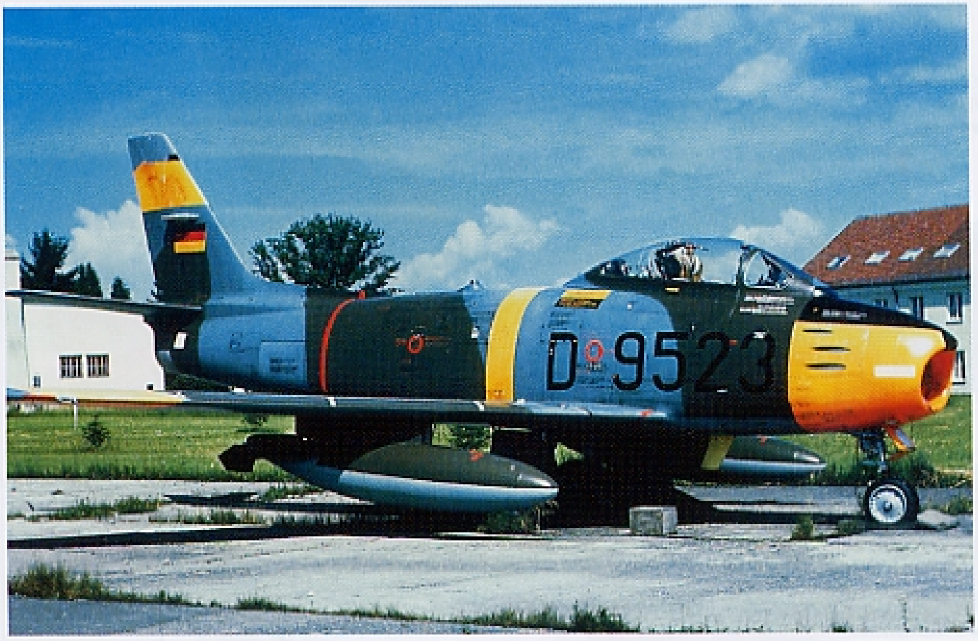
Canadair CL-13 Sabre Mk.2, (F-86-E/M), 11093/093, Akro Grupa 204, Batajnica, Yugoslav Air Force, 1960. Trainer yellow (FS. 13655) overall with French Blue (FS.15200) trim. Standard national markings on fuselage sides, above port and under starboard wings; code '093' repeated in black above starboard and under port wings



C.A.C. Sabre Mk. 31, A94-983/83, N° 75 Squadron 'Black Diamonds', Royal Australian Air Force. Natural metal overall with black and white trim



C.A.C. Sabre Mk. 31, TS8603/03, Indonesian Air Force. White overall with Dayglo Orange and Ident Red trim. National markings in standard positions on fuselage and top of wings, also under starboard wing; 'TNI-AU' in black under port wing

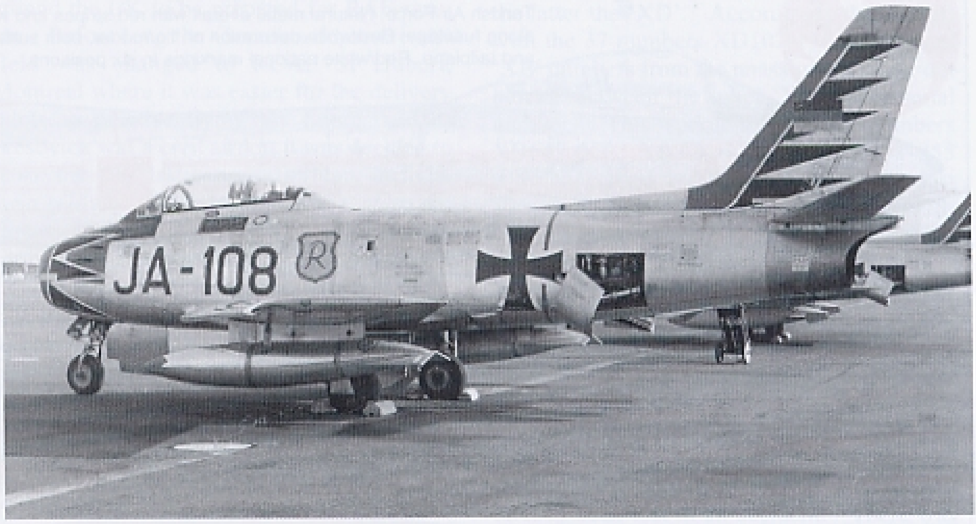


D-9523, a Sabre Mk.6 of the target towing flight based at Sylt, probably after withdrawal from use in the mid-1970s. As part of its later modifications was the installation of a Martin-Baker Mk.5 ejection seat, an anti-collision beacon on the after fuselage decking and large blade aerials on either side of the fin and below the fuselage ahead of the wing leading edge. (Terry Panapolis)

got there first so it was the other aircraft which were given replacement serial numbers! The final serial number blocks for the RAF aircraft are given in the accompanying table on page 44.

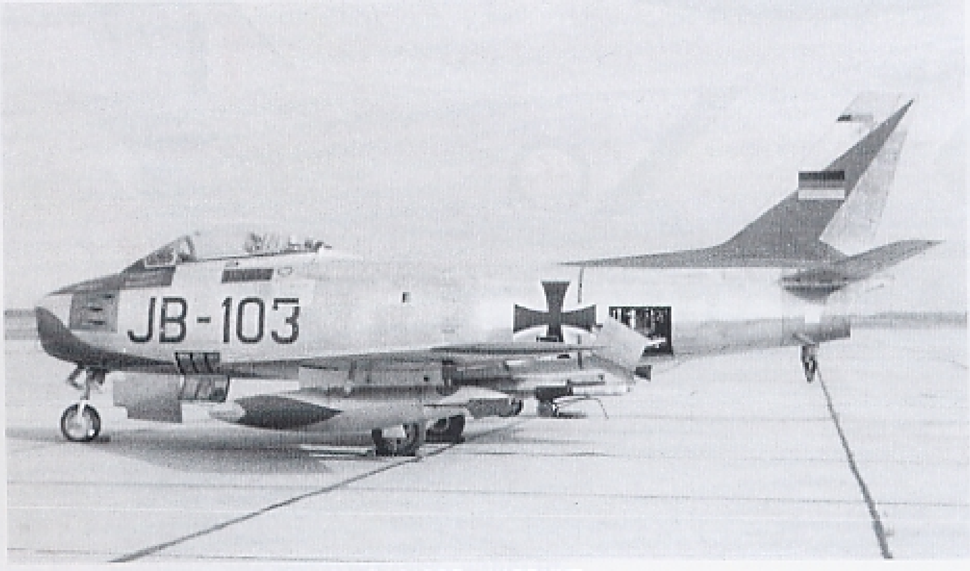
RAF SERVICE

The majority of RAF Sabres were to be based in West Germany to provide a fighter force in the north-west of the country as a part of NATO's 2nd Tactical Air Force and it was to RAF Germany (RAFG) that the first Sabres were delivered. Following a formal acceptance ceremony of the first Sabre F.4s at RAF Abingdon in January 1953 the Sabre Conversion Flight (SCF) was formed at RAF Wildenrath on 10 March 1953 to begin the task of training the Vampire pilots there to fly the new aircraft. Speed was of the essence hence the local conversion training, because from the very beginning more Sabres were available than the RAF had pilots qualified to fly them, and it was seen as a matter of some urgency to get the new jets in to service as quickly as possible. Fighter Command also sent pilots to Wildenrath to convert to the Sabre and by May 1954 a sufficient pool of instructors had been built up at home for 229 Operational Conversion Unit (229 OCU) at RAF Chivenor, which already used a pair of Sabre F.2s, to receive Sabre F.4s and to take over the training task. The SCF was then disbanded the following month. The Sabres' time at Chivenor was destined to be brief however, for by May 1955 they had been replaced by the first of the new Hunter fighters which were already beginning to re-equip the RAF's front-line Sabre squadrons.



Sabre Mk.6 (c/n 1922) 'JA-108' of JG71. The Wing's markings are black with white trim, to which are added the red staffel colour to the fin leading edge, the nose lip, wingtips and drop tank nose. The underwing tanks have the early pattern stabilising fins lacking the small end plates which were to become standard and which are visible on the aircraft parked behind. (APN)

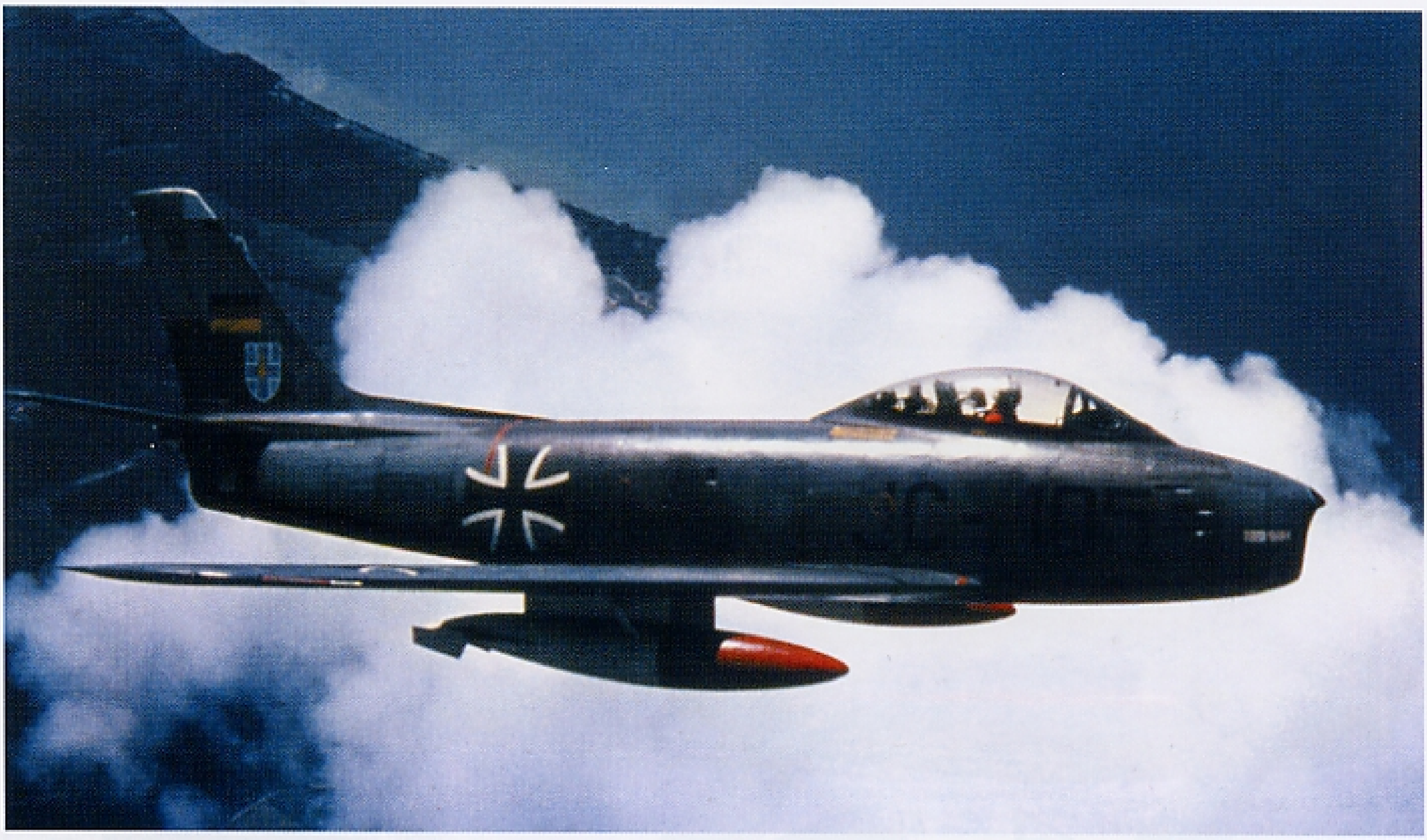
'JB-103' of JG.72 carrying the red trim of 721 Staffel on its tail, nose, wingtips and drop tank front and fins. The drop-panel ahead of the wing root covered the port ammunition bay and doubled as a step for the pilot. (APN)



The Wildenrath Wing was the first RAFG formation to re-equip with the Sabre F.4 beginning with 3 then 67 Squadron who received their first aircraft in May 1953, in each case replacing Vampire FB.5s, followed by 71 Squadron which began to convert from Vampires that November. However, three squadrons of Sabres were deemed too much for the base to handle so 3 Squadron moved out to Geilenkirchen in July before 71 Squadron's aircraft started arriving. The next to give up its Vampire fighter-bombers was the Oldenburg Wing consisting of 20, 26 and 234 Squadrons, which had re-equipped by the end of January 1954 but lost 234 Squadron in the process when it moved to Geilenkirchen.

At Bruggen 130 Squadron was reformed on 1 August 1953 specifically to operate the Sabre then in January the following year 112 Squadron at the same base began to exchange its Vampire FB.5s for Sabres, completing the transition the following month. The last RAFG Vampire wing to re-equip was at Jever where Nos. 4 and 93 Squadrons began to receive their Sabres in March 1954. This was the only RAF wing to receive the late production Sabre F.4s with the '6-3 wing' modification, although some earlier aircraft were possibly so modified during the course of major overhaul.

The number of Sabres involved in re-equipping RAFG may have been significant but their period of front-line service was destined to be short and by June 1956 they had gone, replaced by the Hunter F.4 which many pilots considered to be an inferior air-to-air fighter. The first Hunters began arriving in Germany from April 1955 and went to re-equip two Venom squadrons at Fassberg which then moved to Jever where they operated along-

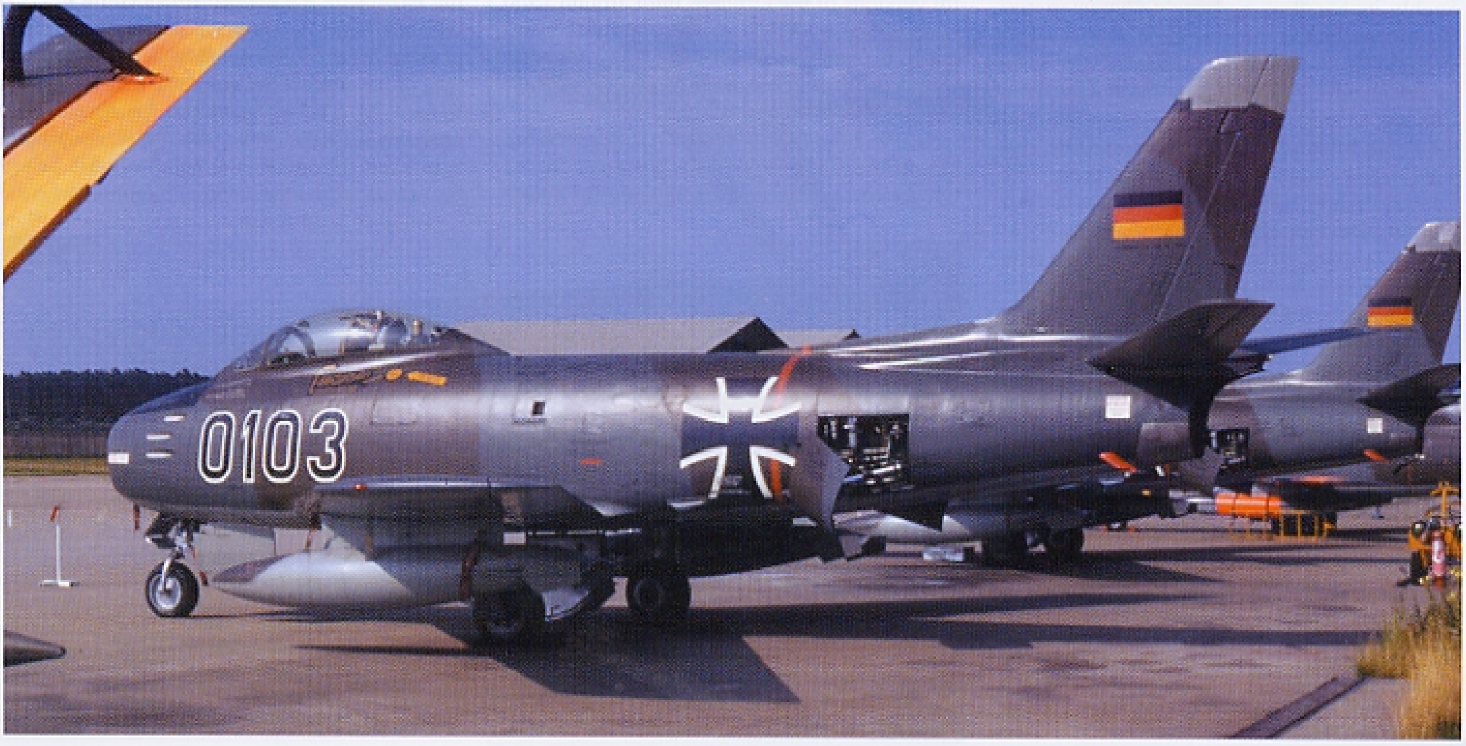


Sabre Mk.6 JC-105 of Lek.G.42 seen on 4 July 1966 clearly showing the unit markings on the fin. (Adrian Balch)

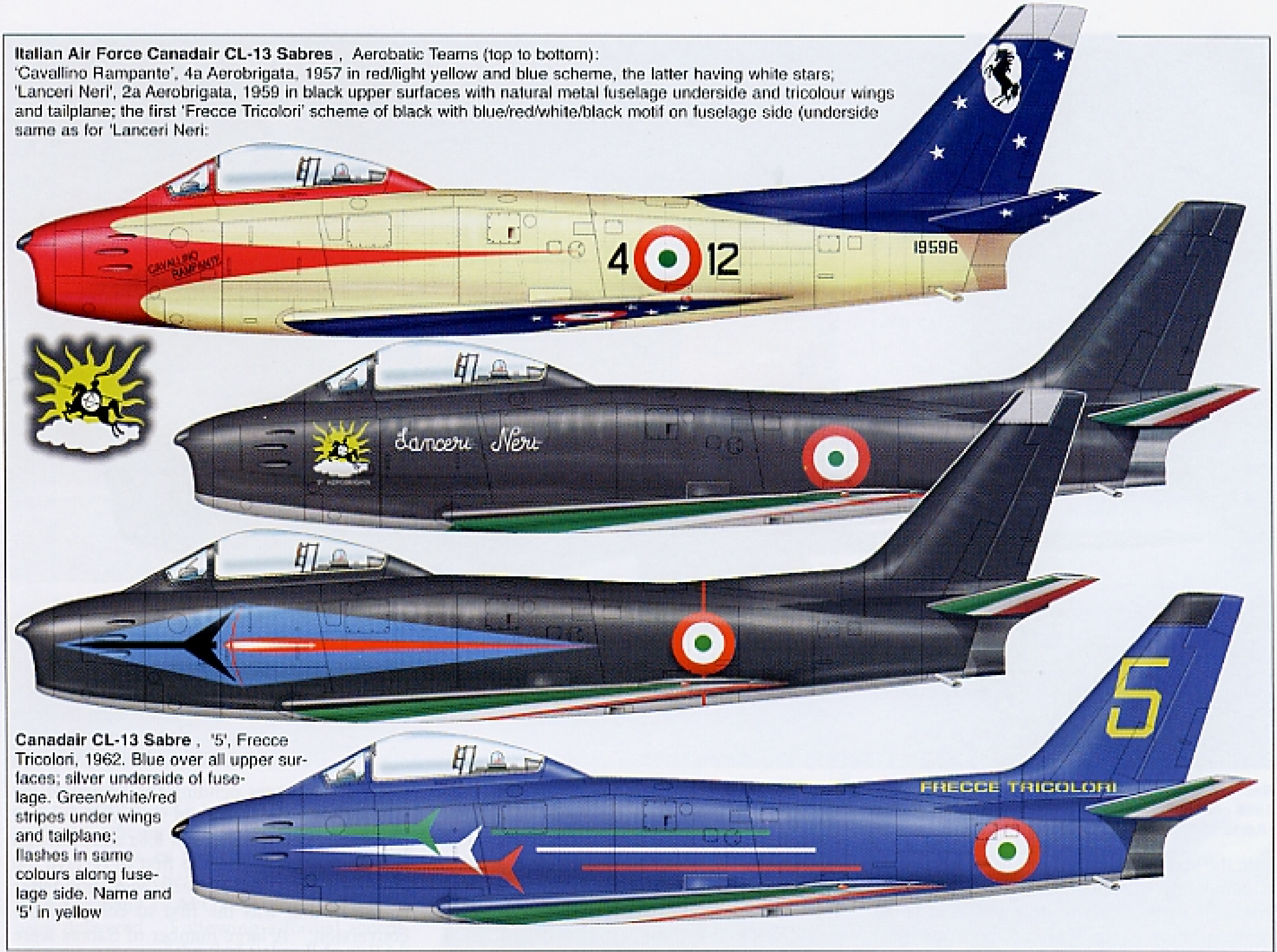
side the station's two Sabre squadrons so that a comparative evaluation of the two types could be made. There then followed some reorganisation of the RAFG Sabre squadrons to establish what were eventually to become the future Hunter Wings, and in July 1955 Nos. 67 and 71 Squadrons moved from Wildenrath to Bruggen.

The first Hunter F.4s went to No. 26 Squadron at Oldenburg in June 1955 followed by No. 4 Squadron at Jever in the following month and by No. 20 Squadron also at Oldenburg that November. In each case conversion to the new aircraft took place in little more than a month. The other unit of the Jever Wing, No. 93 Squadron, received its Hunters in January the following year then with the coming of spring the re-equipment programme quickly gained momentum. The next unit to give up its Sabres was No. 67 Squadron which had re-equipped by March, followed in rapid succession by the other squadrons. When the last aircraft left No. 3 Squadron at Geilenkirchen on 21 June 1956 the Sabre's operational career with the RAF came to an end, having lasted little more than three years.

Besides the ten Sabre squadrons stationed in Germany a further two were based at RAF Linton-on-Ouse as part of RAF Fighter Command. These, together with the RCAF Sabres at North Luffenham and the USAF F-86Ds of the 406th Fighter Interceptor Wing at Manston and F-86As of the 81st Fighter Wing at Bentwaters, formed the nucleus of the UK's air defences pending the arrival of the Hunter. Both Nos. 66 and 92 Squadrons had previously operated Meteor F.8s and although No. 66 Squadron was the first to receive the Sabre in January 1954 it was the latter squadron that was the first to complete the conversion. A large number of Sabres were also held in reserve at Linton and regularly flown by both squadrons so that there were always replacement aircraft available to send out to Germany to keep the squadrons up to strength. However, as with RAFG the Sabre's time on the front line with Fighter Command was destined to be brief, and between March and April 1956 both these



This CL-13B Sabre Mk.6, serialled 0103, became part of the Federal German Air Force Est-61 Test Centre at Manching seen on 16 July 1972. (Adrian Balch)



Italian Air Force Canadair CL-13 Sabres , Aerobatic Teams (top to bottom): 'Cavallino Rampante', 4a Aerobrigata, 1957 in red/light yellow and blue scheme, the latter having white stars; 'Lanceri Neri', 2a Aerobrigata, 1959 in black upper surfaces with natural metal fuselage underside and tricolour wings and tailplane; the first 'Frecce Tricolori' scheme of black with blue/red/white/black motif on fuselage side (underside same as for 'Lanceri Neri:

Canadair CL-13 Sabre , '5', Frecce Tricolori, 1962. Blue over all upper surfaces; silver underside of fuselage. Green/white/red stripes under wings and tailplane; flashes in same colours along fuselage side. Name and '5' in yellow

squadrons made the conversion to the Hunter F.4.

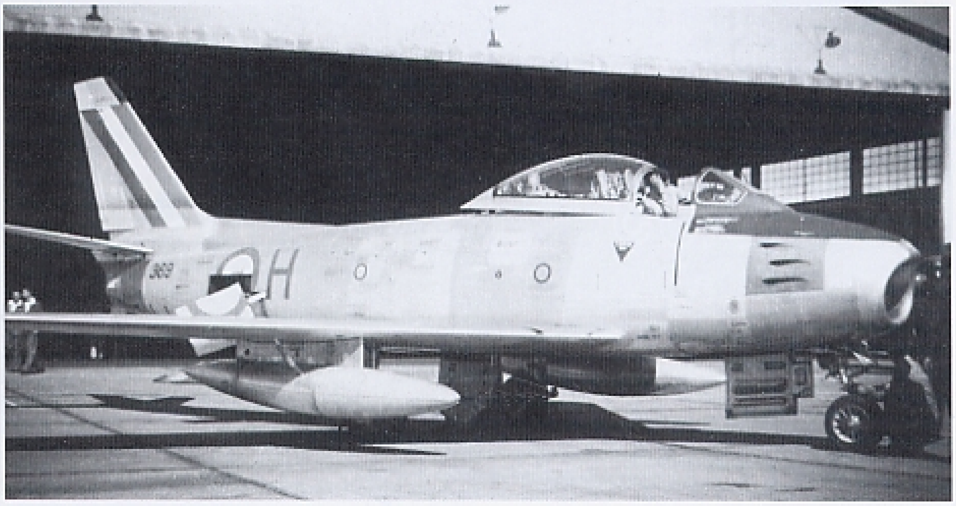
In addition to serving with operational and training units the Sabre also saw limited service with various test and evaluation organisations such as the Aeroplane and Armament Experimental Establishment at Boscombe Down and the Royal Aircraft Establishment, Farnborough. This was not only to test and evaluate the aircraft prior to its entering squadron service but also to examine thoroughly its handling and flight characteristics since it was at the time the very best jet fighter available in the West. One was also used by the Handling Squadron at the RAF Flying College, Manby to assist in the compilation of the Sabre Pilot's Notes. Examples were also used by various subsidiary units of the Central Fighter Establishment such as the Air Fighting Development Squadron, probably at West Raynham, to evaluate and develop new fighter tactics taking full advantage of the Sabre's improved performance over existing RAF fighters, notably the Meteor F.8. The Sabre also served with the Central Gunnery School at Leconfield and from January 1955 with its successor unit, the Fighter Weapons School, whose tasks included the training of air weapons and tactical instructors for frontline squadrons.

Being completely foreign in origin the Sabre found little use as a development aircraft in Britain, but XB982 was used by Bristol-Siddeley as a test bed for the Orpheus BOr 12 turbojet engine being developed to power Fiat's contender for the NATO lightweight reconnaissance and strike fighter competition. Following its major overhaul XB982 was delivered to Patchway in March 1957 to be fitted with the new engine and made its first flight on 3 July the following year. It then undertook various trials at Filton fitted with progressively more powerful versions of the Orpheus until around 1960 when it was placed in storage, and was eventually scrapped there in June 1962 together with XB900 which had been used as an engineering spares source.

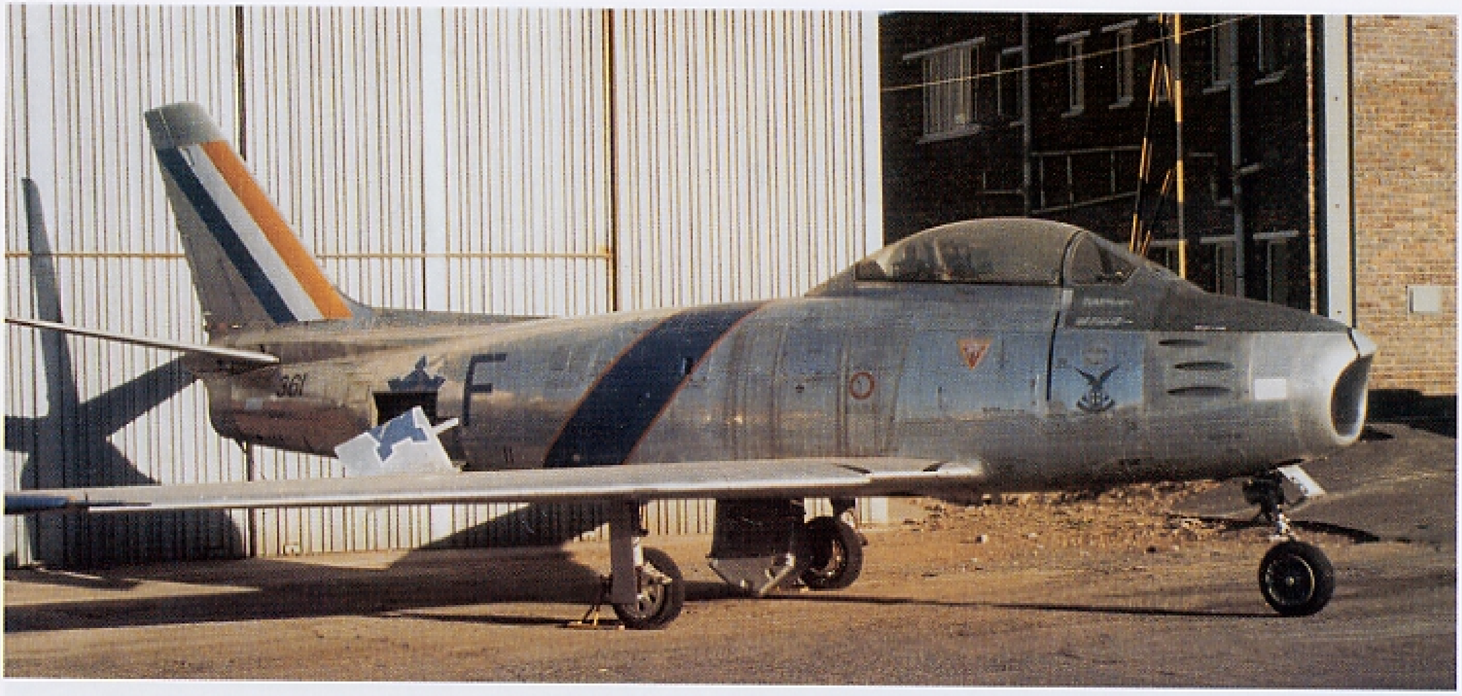
In 1967 the former Italian Air Force Sabre Mk.4/F-86E(M) 19607 was returned to the UK for restoration and display and for a time was allotted the civil registration G-ATBF. Another example later returned from Italy eventually to become an exhibit in the RAF Museum, Hendon, carrying its original serial number XB812.

A NEW LEASE OF LIFE

As both the Canadian and British Sabre Mk 2 and Mk 4 aircraft were withdrawn from service some returned to Canada but most, including those which had been financed by the US through MDAP, were scheduled to be supplied to other NATO air arms. To begin with the former RAFG Sabres were flown to RAF Benson by No.147 Squadron for checks and probably also to have the British-supplied equipment removed, the final aircraft being ferried back in June 1956. Eventually how-



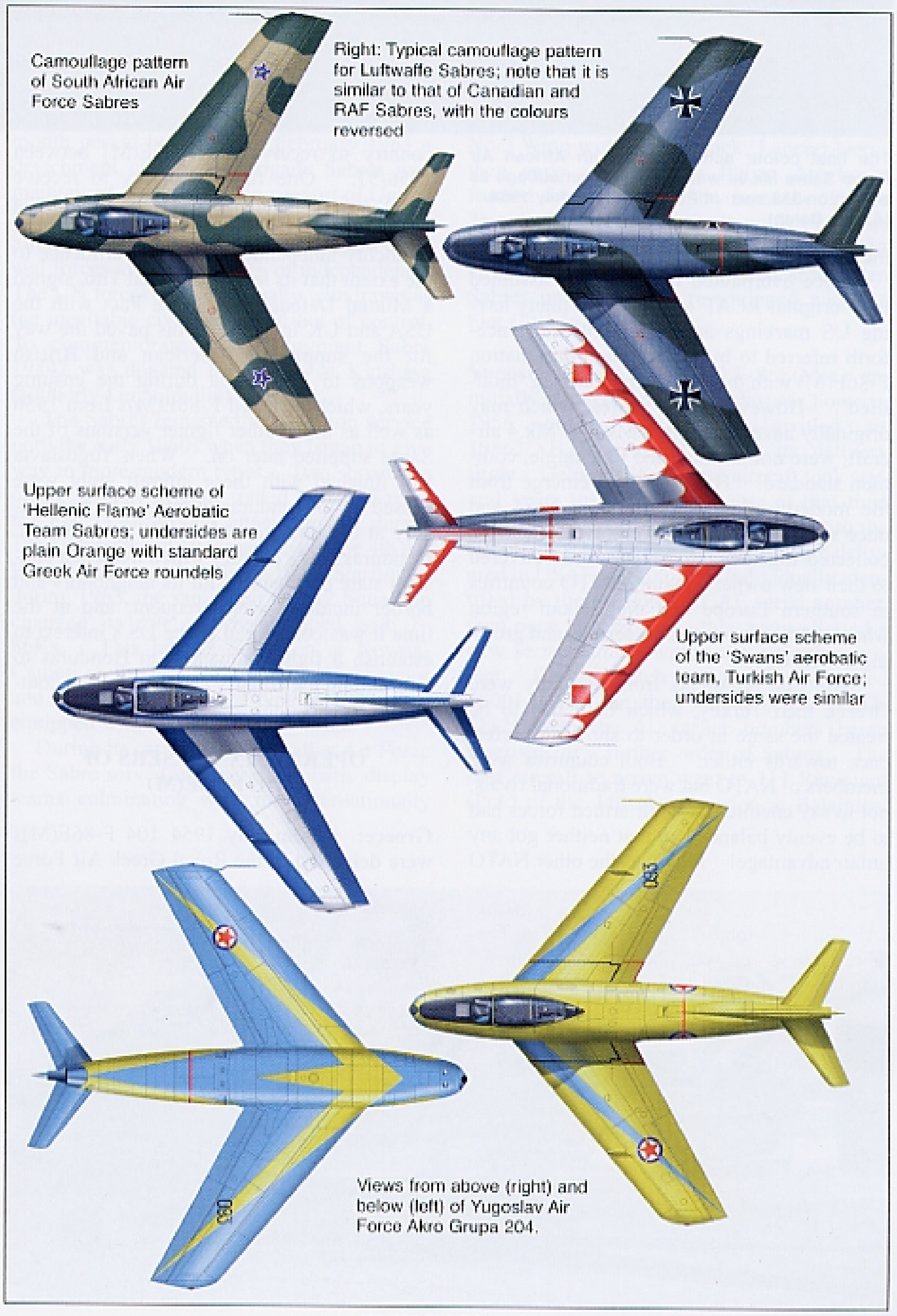
Sabre Mk.6 369:H probably of 1 Squadron South African Air Force wearing the original pattern roundels. The only squadron marking is the individual code letter which in black and white pictures is often impossible to distinguish between the blue codes of 1 Squadron and the red ones of 2 Squadron (MAP)



SAAF Sabre Mk.6 of 1 Squadron wearing the blue and red sash aft of the wings after the fashion of the identity markings adopted by USAF and SAAF Sabres during the Korean war. The wing tips are also blue and the squadron badge is marked on the fuselage below the rear of the anti-dazzle panel. The last two figures of the serial are repeated in black on the nose wheel door.

ever, all the Sabres were delivered to various aircraft companies in the UK where they were given an initial survey followed by a complete overhaul if the state of the airframe justified this. Those which failed their survey were stripped of useful spares and scrapped. In most cases the airframes were fitted with the solid '6-3 wing' leading edge extensions during the course of overhaul, as well as being brought up to the latest modification state compatible with the F-86E at that time. Besides the RCAF aeroplanes some 302 former RAF Sabres went through the modernisation programme between 1956-58.

This refurbishment was co-ordinated by the Ministry of Supply and mostly financed by the British government as a means of reimbursing the US government for the supply of the MDAP Sabres in the first place and for helping to finance the Hunter and Canberra programmes. Much of the work was undertaken by Airwork at Speke who had been responsible for the major servicing and repair work on the original RCAF and RAF Sabres, but other companies such as Scottish Aviation at Prestwick, Hawker Aircraft at Dunsfold, Aviation Traders at Stansted and Westland at Ilchester and Merryfield were also involved. Work on the J47 engines was carried out by Bristol-Siddeley Engines at Filton. This programme was terminated in 1958 whilst there were still airframes left to modernise largely because by that time demand for the J47-powered Sabre day fighters had virtually dried up. There were plans to complete conversion of the remaining aircraft which would then be stored by Fokker for future supply to NATO air forces who needed replacement aircraft, or for sale, but nothing came of this and these surplus airframes were eventually scrapped. Their remains were then disposed of to various aeronautical scrap yards around the country such as at Church Crookham and Lasham where they were still in evidence into



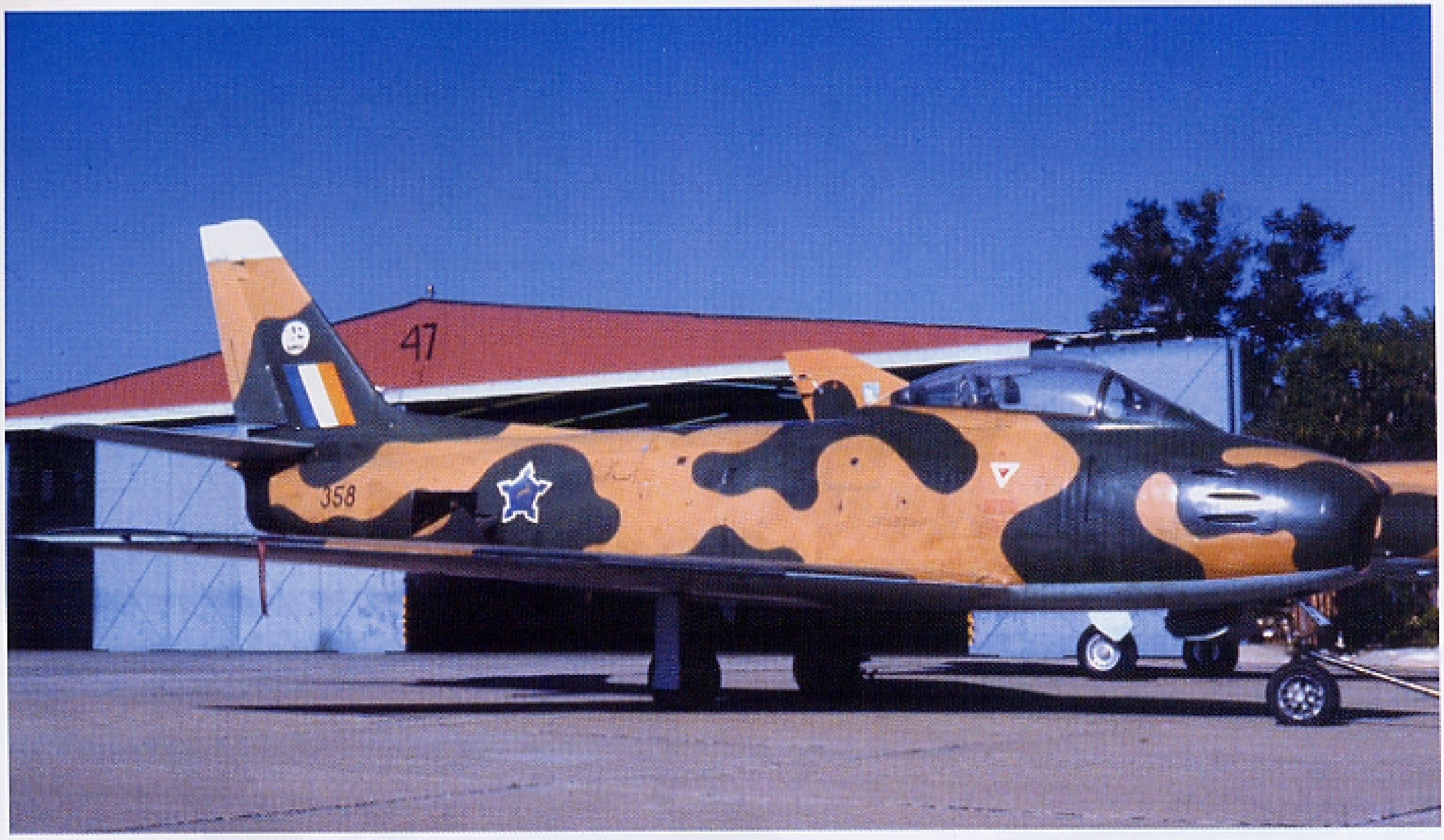
Camouflage pattern of South African Air Force Sabres

Right: Typical camouflage pattern for Luftwaffe Sabres; note that it is similar to that of Canadian and RAF Sabres, with the colours reversed

Upper surface scheme of 'Hellenic Flame' Aerobatic Team Sabres; undersides are plain Orange with standard Greek Air Force roundels

Upper surface scheme of the 'Swans' aerobatic team, Turkish Air Force; undersides were similar

Views from above (right) and below (left) of Yugoslav Air Force Akro Grupa 204.



The final colour scheme of South African Air Force Sabre Mk.6s was two tone camouflage as shown on 358 seen at Pietersburg in July 1984. (Adrian Balch)

the early 1960s.

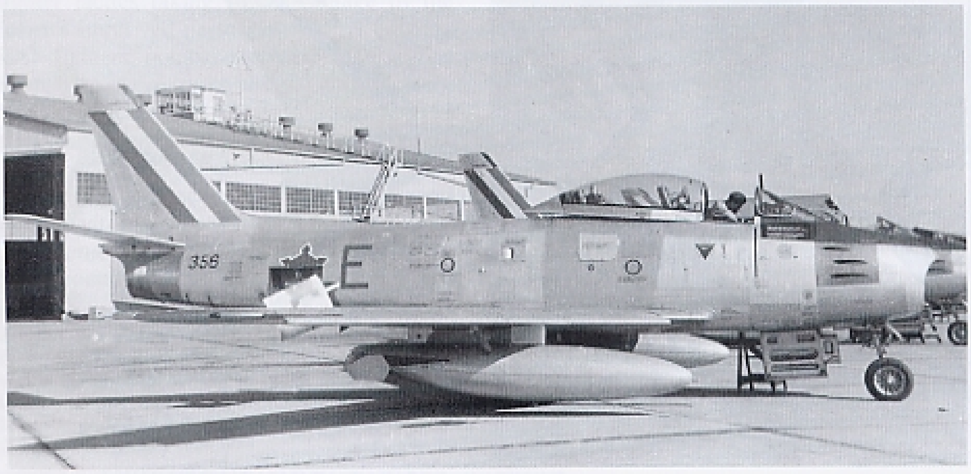
Once overhauled these aircraft assumed their original RCAF identity with many having US markings applied, and were henceforth referred to by the common designation F-86E(M) with the 'M' suffix denoting 'modified'. However these Sabres, which may originally have been either Mk.2 or Mk.4 aircraft, were not all modified to a single, common standard. They began to emerge from the modernisation programme in 1954 and once sufficient numbers were available were collected together into groups and delivered to their new owners, mainly NATO countries in southern Europe and the Balkan region where there was felt to be a serious and growing Soviet threat.

The first recipients from that July were Greece then Turkey, which both had to be treated the same in order to show no preference towards either. Both countries were members of NATO but were traditional rivals, not to say enemies, so their armed forces had to be evenly balanced so that neither got any unfair advantage! Italy was the other NATO country to receive the F-86E(M) between 1956-57. One further country to receive these refurbished Sabres was Yugoslavia which, despite being a socialist state, was staunchly independent of Soviet influence to the extent that its leader, Marshal Tito, signed a Mutual Defense Assistance Pact with the USA and UK in 1951. This paved the way for the supply of American and British weapons to Yugoslavia during the ensuing years, which included F-86E(M)s from 1956 as well as all-weather fighter versions of the Sabre supplied later on. When Yugoslavia had finished with these aircraft eight were passed on to Honduras in mid-1976, presumably at the direction of the US government. Honduras was a country which lived in a constant state of tension with its neighbours and border incidents were frequent, and at the time it was considered in the US's interest to establish a fighter squadron in Honduras to help defend the country against external communist threats.

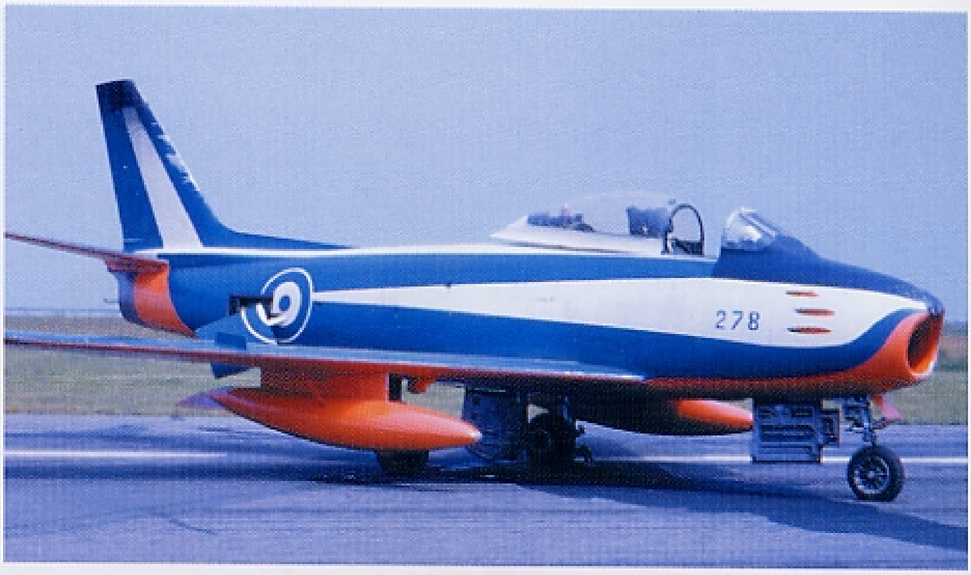
OPERATIONAL USERS OF THE F-86E(M)

Greece: From July 1954 104 F-86E(M)s were delivered to the Royal Greek Air Force and these retained their RCAF serial numbers whilst in Greek service. The first aircraft were delivered to Elefsis in the western suburbs of Athens where they went to re-equip 341 Squadron (Moira) tasked with providing air defence for the capital. The remaining Sabres were delivered to Elefsis the following year to equip the other two squadrons of the wing, but the exact identities of these units remain unclear. Probably they were numbers 337 and 343 Squadrons but some sources claim they were 342 and 343 Squadrons. Even the wing number is uncertain for whilst it is generally said to have been No. 111 Wing (Pteruga), No. 112 Wing has also been mentioned although in later years at least the latter was the identity of the Elefsis-based transport wing. Once the fighter wing was fully operational it moved out to Tanagra during 1956 which was a better base from which to defend both Athens and central Greece, areas thought to be vulnerable to attack not so much from the USSR as from Turkey across the Aegean Sea. From August 1958 until September 1964 341 Squadron also operated the official air force aerobatic team, the 'Hellenic Flame', which flew up to seven aircraft painted in the blue and white national colours, with red undersides, including 19294, 19377,19382, 19392 and 19448.

The F-86E(M)s have also been reported as operating from Nea Aghialos, farther north, with 341 Squadron finally operating from Elefsis once more, so it is possible that by the end of the Sabre's career the three individual squadrons had been deployed separately to provide better air defence coverage. This uncertainty about the Sabre F-86E(M) squadrons seems to have arisen when contemporary reports confused this type of Sabre with the F-86D which was also serving with two squadrons of the Greek Air Force.



Sabre Mk.6 356:E of 1 Squadron SAAF with a blue code letter and wing tips. Evident on this photograph are the different panel colours in shades of natural aluminium, painted silver and grey. (MAP)



A Greek Air Force F-86E(M), 19347, of the 'Hellenic Flame' display team at the Paris Air Show in 1963. The colour scheme was basically blue and white with red undersides.

Perhaps this was intentional at the time in order to confuse the Turks, but the confusion persists!

During the mid-1960s the squadrons of 111 Wing, now part of NATO's 6th Allied Tactical Air Force, were due to re-equip with US-supplied F-5A and F-5B Freedom Fighters, indeed deliveries began in 1965 and 341 Squadron became operational on the new type in July of that year. The following year another unit (probably 343 Squadron) converted but re-equipment of the third squadron was interrupted during 1967 when a right-wing army coup that April ousted King Constantine and caused the USA to suspend arms deliveries. It was not until February 1969 that F-5 deliveries were resumed but by the end of that year 111 Wing had fully re-equipped with the type and consolidated all its squadrons at Nea Aghialos. At this time the wing's individual units are confirmed as being numbers 337, 341 and 343 Squadrons.

Turkey: To maintain the balance of power in the region Turkey also began to receive the first of 107 F-86E(M)s from 1954, with several others probably delivered later to replace aircraft which had been lost during their delivery flight. The Sabres went to equip 141, 142 and 143 Squadrons of a day fighter wing at Eskisehir in western Turkey, part of the Turkish 2nd Tactical Air Force. Once all were fully operational they moved to Merzifon near the Black Sea coast in 1956. It has been reported that an undisclosed number of former USAF F-86Es were also delivered to Merzifon as attrition replacements but this remains unconfirmed. Not to be outdone by the Greeks the Turkish Air Force also put up an F-86E aerobatic display team, the 'White Swans', during the 1960s, using aircraft such as 19103.

From 1964 the F-86E(M)s were gradually withdrawn from service as more modern types became available, starting with 141 Squadron which was re-equipping with the F-104G Starfighter. The other two Sabre squadrons both received F-5A Freedom Fighters with 142 Squadron converting in 1967 and 143 Squadron in 1968.

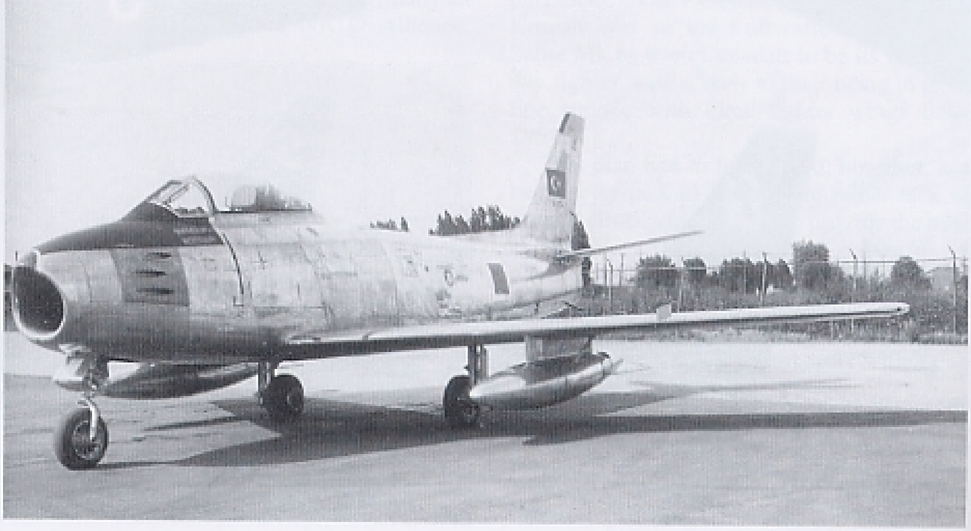
Italy: Between 1956-57 Italy received 180 former RAF Sabres. These were all referred to as F-86E(M)s but consisted of the former Sabre F.2 19404/XB532 and 179 Sabre F.4s, and all were identified by their former RCAF serial number. These aircraft initially went to equip 4th Air Brigade (Aerobrigata) at Pratica di Mare, then in 1959 this formation appears to have moved north to Grosseto. However, in 1961 10 Squadron (Gruppo) moved out to Capua-Grazzanise in southern Italy and probably about the same time 12 Squadron went to Gioia del Colle leaving just 9 Squadron at Grosseto. All now operated as individual air defence squadrons but remained under the overall control of the 4th Air Brigade. The F-86E(M) was also operated by 8, 13 and 14 Squadrons of 2nd Air Brigade, originally 2 Wing (Stormo) based at Montichiari. Once operational the air brigade moved to Novara-Cameri in 1957 but with one squadron detached to Rimini, and thereafter undertook the air defence of northern Italy.

Whilst in Italian service, trials were carried out with air-to-air rockets and also test examples of the Italian C-7 air-to-air missile, but neither weapon was adopted. For a four month period beginning in February 1963 a detachment of 4th Air Brigade Sabres was maintained in the Congo in support of United Nations forces trying to maintain order in the aftermath of the withdrawal of Belgian colonial forces and the granting of independence. The UN forces were eventually withdrawn as the inevitable civil war raged out of control. To commemorate this deployment Sabre 19542 was donated for display at Kinshasa (formerly Leopoldville).

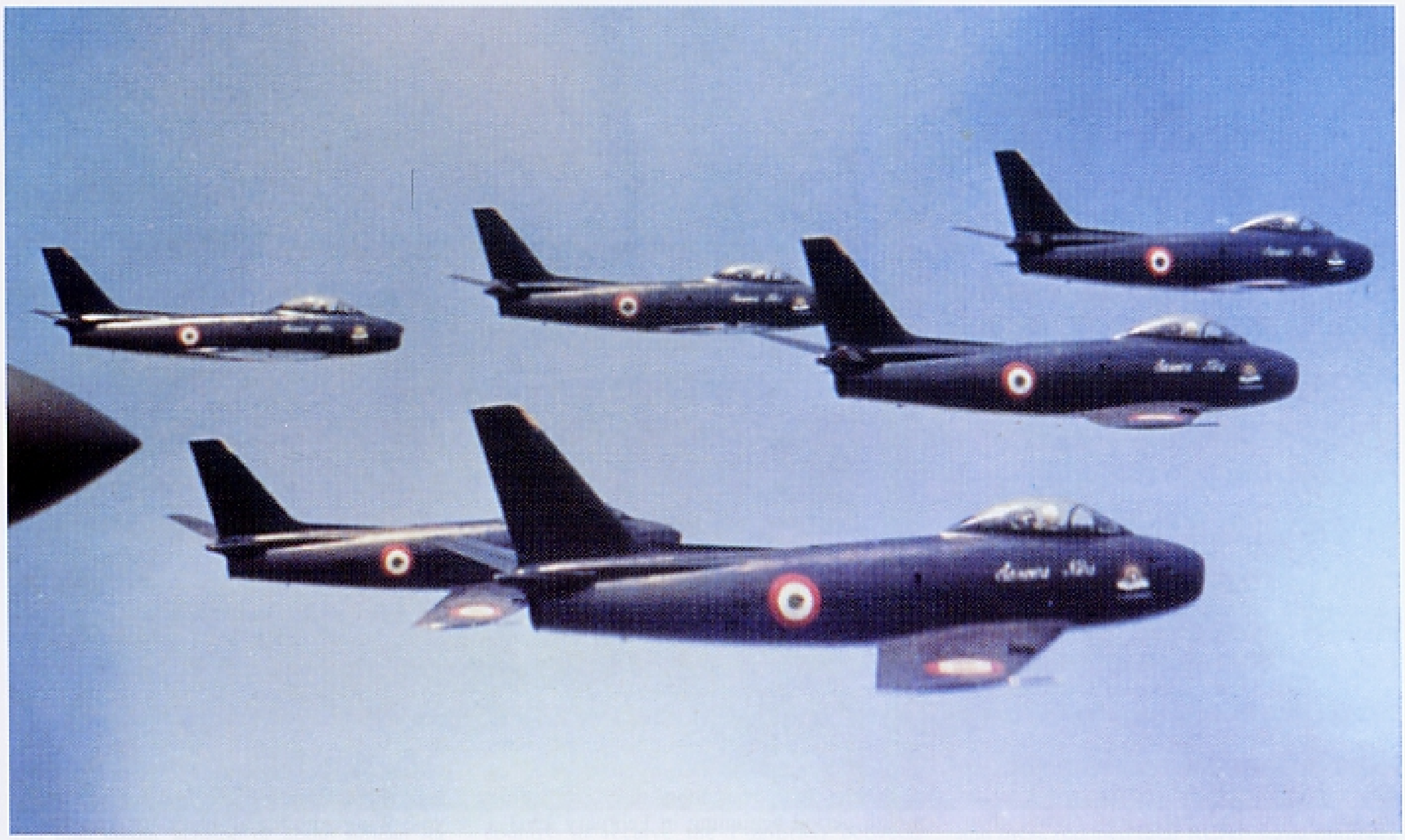
The Sabres remained in squadron service until the early 1960s when they began to give way to more modern types. Two squadrons of the 2nd Air Brigade traded in their Sabres for Fiat G.91 ground attack aircraft during 1962 whilst 9 and 10 Squadrons of the 4th Air Brigade converted to the F-104G Starfighter during 1963, the same year that 12 Squadron changed its role and re-equipped with F-86Ks. This left 13 Squadron at Novara-Cameri as the last F-86E(M) Sabre operator and it continued to fly the type until it too re-equipped with the Fiat G.91 in 1965.

During its career with the Italian Air Force the Sabre served in several aerobatic display teams culminating with the internationally renown 'Frecce Tricolori'. The first team to form was the 4th Air Brigade's 'Cavallino Rampante' at Pratica di Mare which gave displays during the 1956-57 air show seasons. Initially the team used four aircraft drawn from the wing's complement as required, but later specific aircraft such as 19685 were allocated to the team and given a special ivory, red and blue colour scheme. For the next two years the Sabre display team was provided by No.2 Wing with the all-black 'Lanceri Neri', then early in 1961 the Italian Air Force formed the national display team the 'Frecce Tricolori', probably at Rivolto. This autonomous unit became 313 Squadron (313 Gruppo AA) and generally used around ten Sabres until the team re-equipped with the Fiat G.91 in early 1964.

Yugoslavia: Although 80 F-86E(M)s were initially allotted to the Yugoslav Air Force in 1956 only 79 actually arrived as 19863/XB775 crashed during its delivery flight. Delivery of all these aircraft took several years to complete because at that time priority was given to supplying Sabres to the Italian Air Force. The aeroplanes were delivered in USAF markings but individually identified by their original RCAF serial number, then once in Yugoslavia they were allotted a new serial number within the Yugoslav system. The first batch was initially numbered 06001-06080 but then re-numbered 11042-11121 with the 41 earlier numbers being reserved for a further order of Sabres. The first aircraft to arrive went to 117 Regiment (Puk) of the 44th Air Division at Batajnica,



This Sabre F-86E(M) 19374, was destined for the Turkish Air Force. Apparent in this picture is the relatively narrow track of the Sabre's main undercarriage dictated by the thin wing and the need to accommodate the main wheels within the fuselage underside. (Canadair)



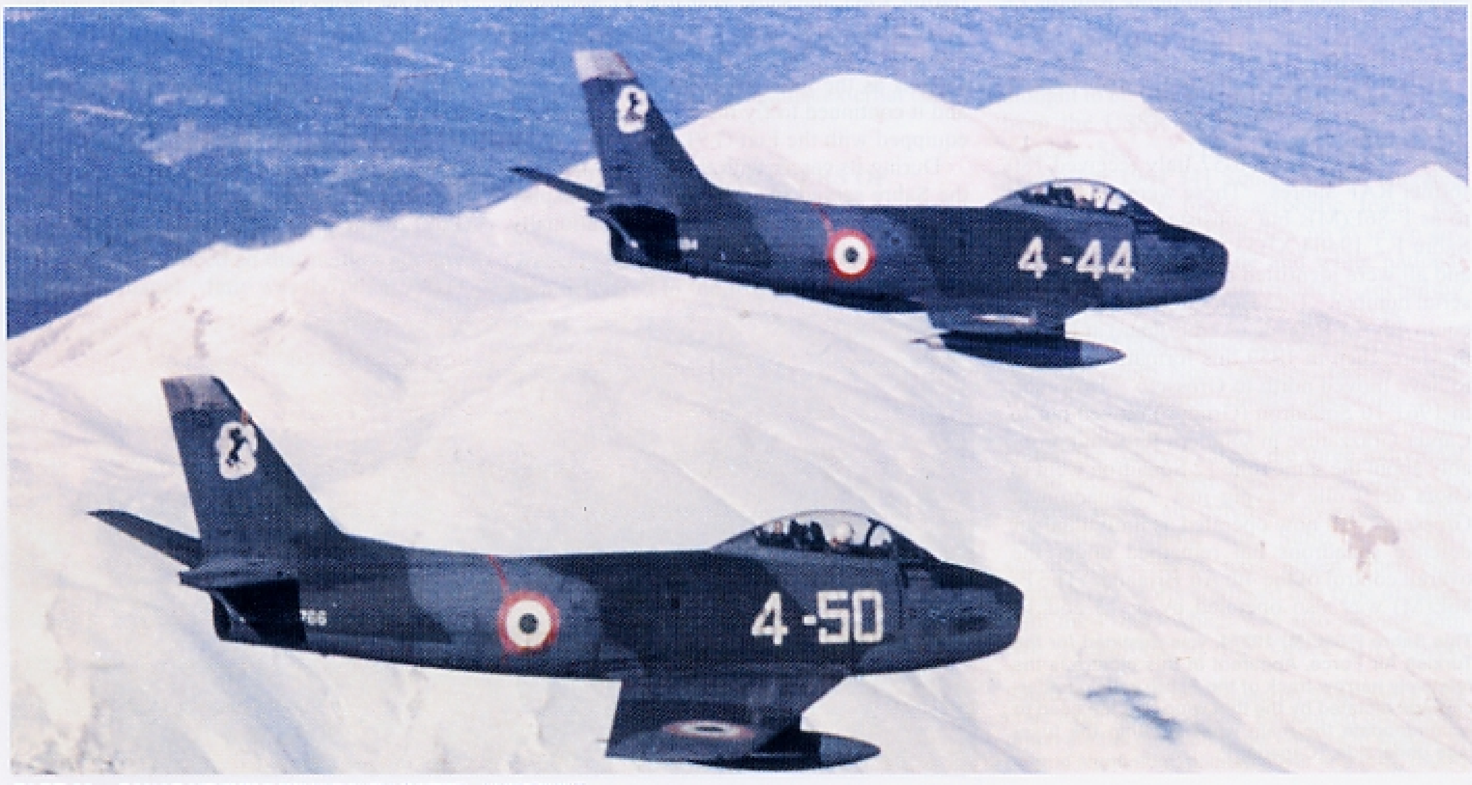
The Italian Air Force aerobatic team 'Lanceri Neri' were all-black apart from the national markings and the name and badge on the nose. They took part in many international air shows throughout Europe. (Adrian Balch)

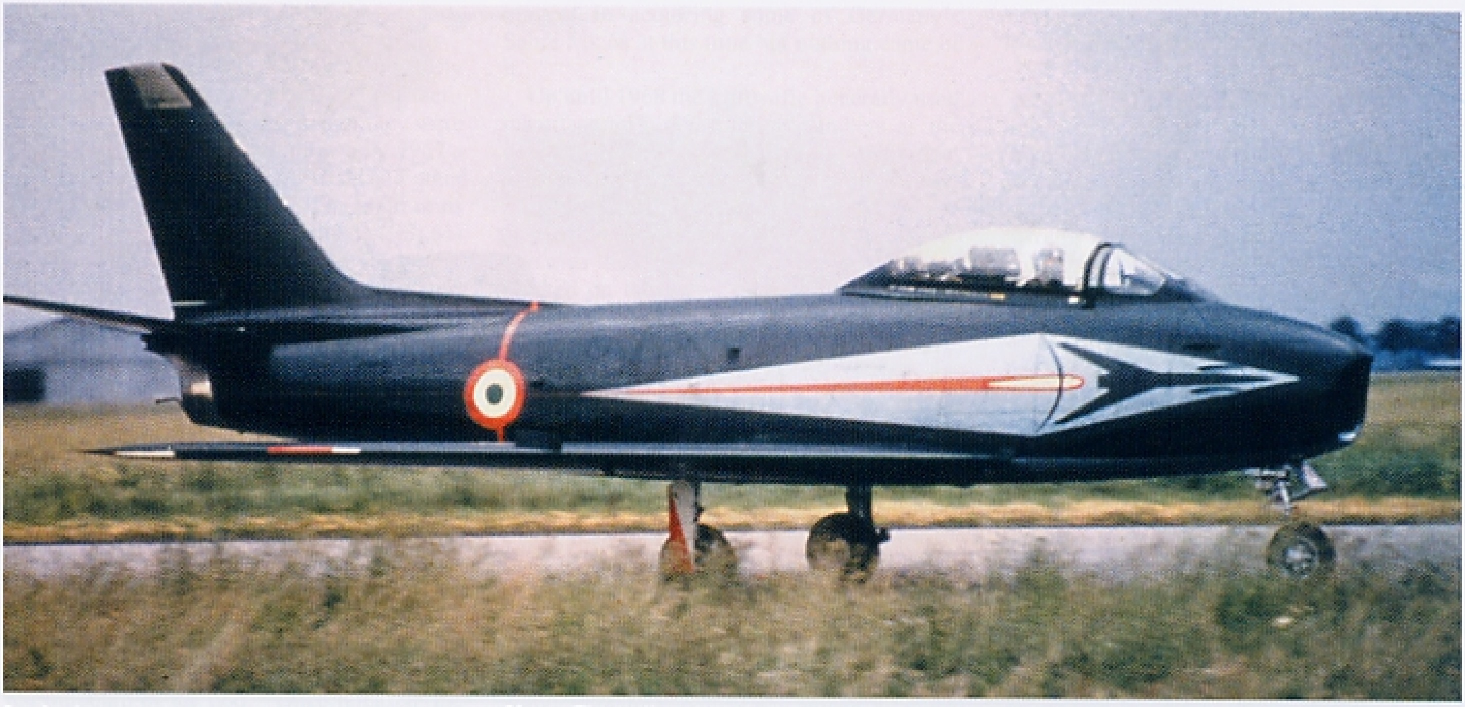
tasked with the defence of Belgrade, but because of the slow delivery rate it was not until the end of 1957 that the regiment was more or less up to strength. Thereafter, the remaining aircraft were delivered to 204 Regiment also at Batajnica, but it quickly became apparent that more Sabres would be needed to provide adequate air defence over Yugoslavia. This was at a time when the USSR was exerting great pressure on the central European members of the Warsaw Pact to follow the Kremlin party line, and Tito was determined to preserve Yugoslav independence at all costs.

A further batch of F-86E(M)s was purchased by the Yugoslav government from the stock of overhauled Sabres held in Europe, with numbers allocated at the beginning of the revised Sabre serial block, but doubt still exists over how many aircraft were involved. The generally accepted number is 41 which agrees with known serial allocations, but a total of 78 aircraft has also been claimed, with some of the extra aeroplanes reportedly coming from the Italian Air Force. However this confusion probably stems from the fact that most of the Yugoslav Sabres staged through Italy on their delivery flight and so their eventual destination was often initially unclear at the time. As deliveries continued two further day fighter units were re-equipped, 83 Regiment at Zemun and 94 Regiment at Skopje, with both achieving operational status by 1960. Also ordered at about this time was a quantity of former USAF F-86D Sabres, some of which went to re-equip 117 Regiment at Batajnica beginning in 1962, allowing its F-86E(M)s to be passed on to the other regiments.

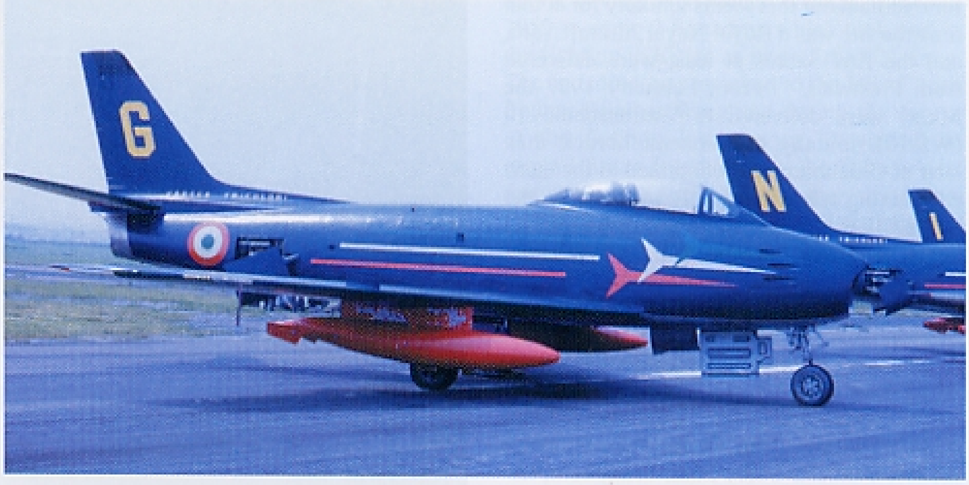
However by then relations between Yugoslavia and the USSR had improved to the extent that the Yugoslav Air Force was

Two F-86E(M)s of the Italian Air Force formate over the mountains. They belonged to 4 Aerobrigata with 19766:4-50 the nearest to the camera (Adrian Balch)





Above: The earliest markings of the 'Frecce Tricolori' were based on those of the 'Lanceri Neri' display team from the 2nd Air Brigade. They had smaller roundels and a conspicuous fuselage flash in red, white, light blue and probably black. (Adrian Balch) Below: By 1963 when this picture of 19625:G of the 'Frecce Tricolori' was taken they had quite a different colour scheme. This was basically a dark blue with dull silver fuselage undersides and green, white and red wing and tailplane undersurfaces. Along the fuselage sides were three stylised aircraft shapes and exhaust trails in the national colours with green being at the top but here lost against the dark fuselage. The team name was along the dorsal spine and the code letter on the fin and nosewheel door were in yellow. (MAP)



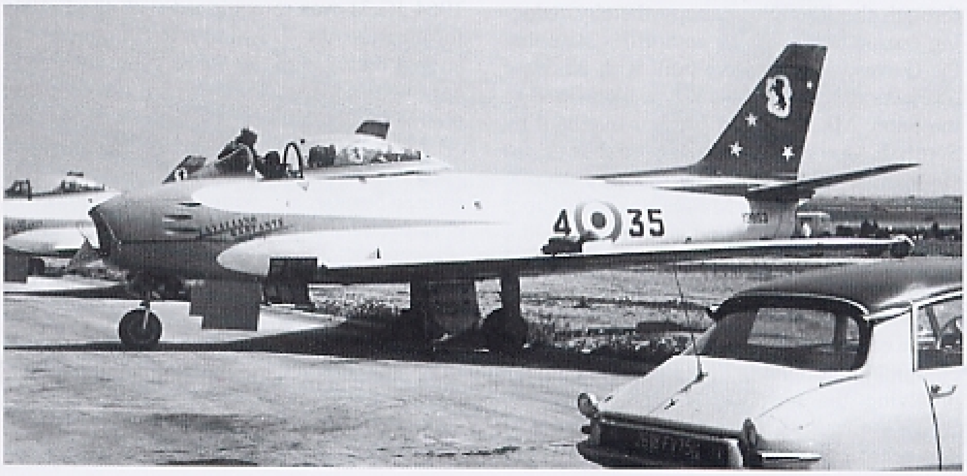
beginning to receive MiG-21Fs and these started to replace the Sabres in the day-fighter regiments. The first to re-equip was 204 Regiment at Batajnica whose first MiGs arrived in 1963 and thereafter the Sabres were progressively phased out with the other regiments, the last of the type finally being withdrawn in 1971. In the case of 94 Regiment however, it re-equipped with F-86Ds rather than MiGs during the course of 1967-68.

Honduras: In 1976 the Honduran Air Force acquired eight former Yugoslav F-86E(M)s which were shipped by sea to Fort Lauderdale, Florida where they were assembled and tested before being flown on to Honduras. There they equipped the Escuadrilla de Caza-Bombardeo (Fighter-Bomber Squadron) at La Ceiba from July 1976. The following year they were joined by a pair of F-86Fs including 3009, probably donated by Venezuela, which probably explains some reports that 10 F-86E(M)s were received. The Sabres were all eventually replaced by Cessna A-37Bs supplied by the USA and were reportedly withdrawn from use in 1986, but in all probability they had already been grounded by then due to lack of spares and do not appear to have been used operationally from at least 1982.

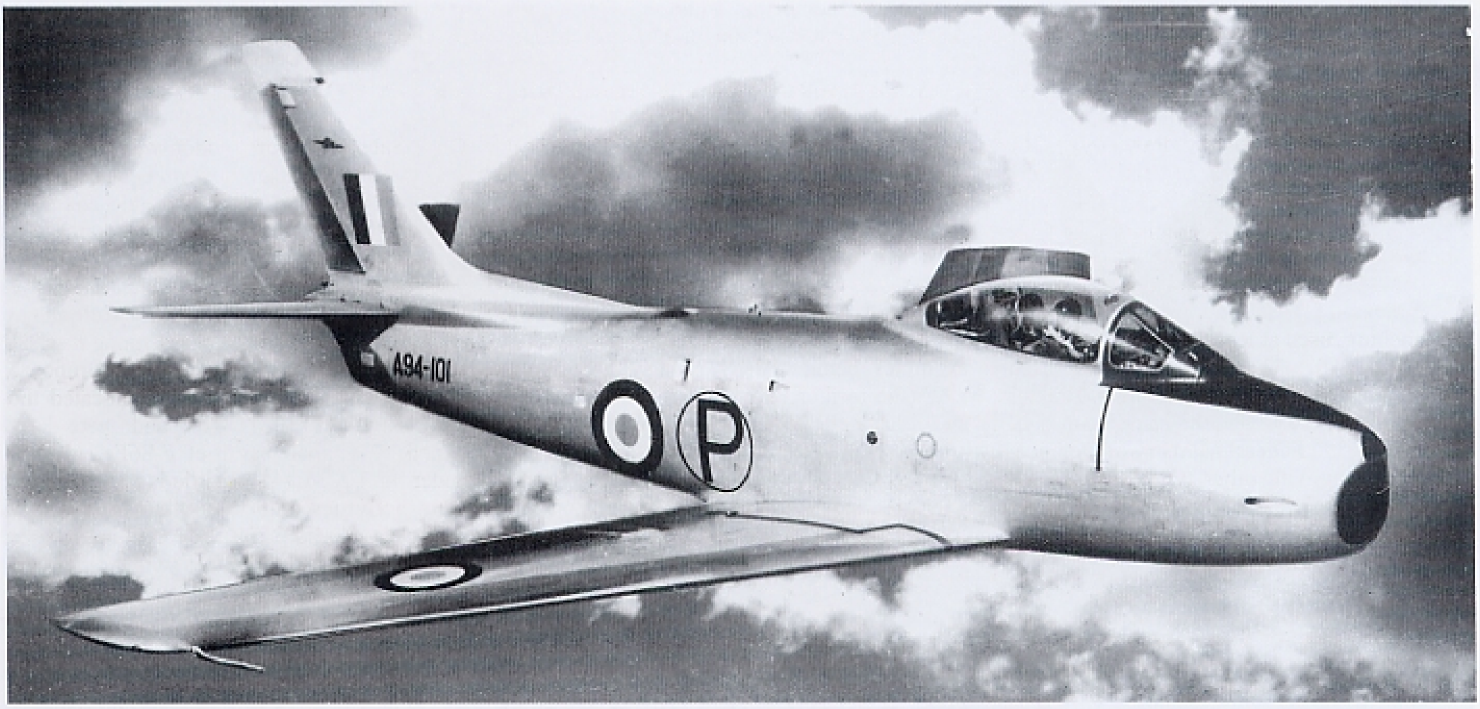
CANADAIR EXPORTS TO GERMANY

Besides the Sabres supplied to the USAF and those passed on to other air forces under the Mutual Defense Assistance Program financed by the US government, Canadair also successfully obtained export orders for the CL-13. The largest of these came from the Federal German government as part of the huge German rearmament programme aimed at making a rehabilitated western Germany an important member of the NATO Alliance, especially as its eastern border was the Iron Curtain itself. Following the formation of the new Luftwaffe in 1956 there was the need to get the new air arm onto an operational footing as soon as possible and this necessitated ordering large numbers of aircraft and recruiting the personnel to operate and support them. The F-86 had proved itself in the Korean War so the Luftwaffe ordered 225 Sabre Mk.6s from Canadair to be its standard day fighter, with a view to their being in front line service with three fighter wings from 1957.

This plan had to be delayed, however, not because of lack of aircraft but rather lack of trained pilots. In an effort to provide the necessary pilots 75 former RCAF Sabre Mk.5s were acquired in 1957-58 for operational training purposes, mainly concerned with tactical flying and weapons training. During the course of 1956 these aircraft were withdrawn

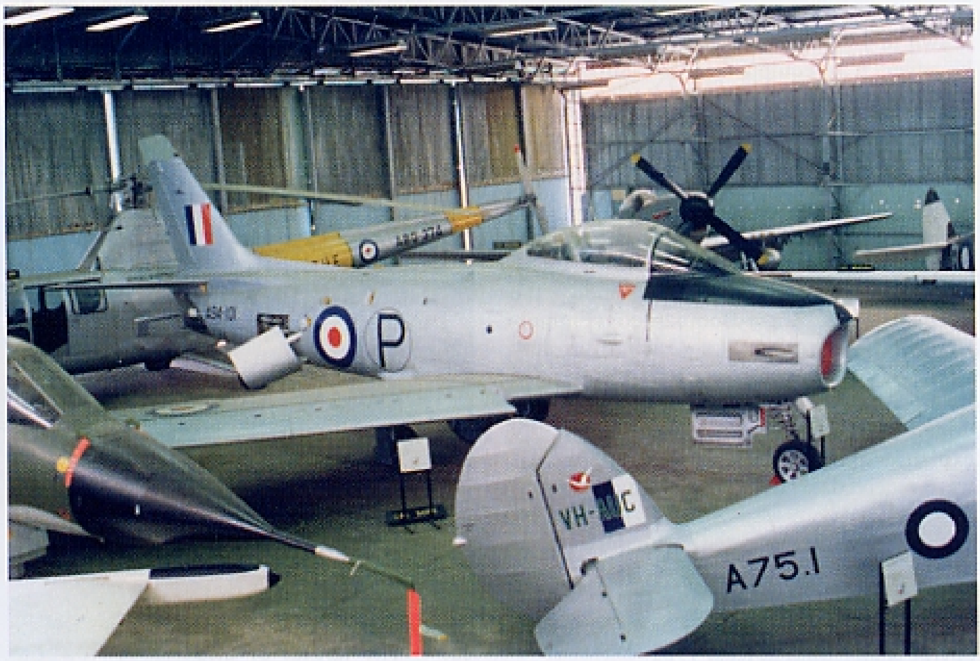


F-86E(M) 19853:4:35 of the 'Cavallino Rampante' team from 4th Air Brigade. Whilst the team's Sabres were all given the same colour scheme they retained their original individual brigade code numbers which did not run consecutively. (APN)



from the Canadian squadrons based in Europe and sent to Scottish Aviation at Prestwick for major overhaul, after which they were presented to Germany as a gift from the Canadian government. These aircraft have also been reported as having gone to Renfrew for overhaul but this seems unlikely for at that time the site was a Royal Naval Aircraft Yard, and the first Sabres at least were delivered from Prestwick. From February 1957 the Mk.5s were delivered to Waffenschule 10 (WS.10), initially at Furstenfeldbruck then later at Oldenburg, and continued in the tactical training role until finally replaced by the Sabre Mk.6, the first examples of which had begun to arrive on WS.10 from late 1958. These then continued in their training role until the type was withdrawn from front-line service.

Above: The Commonwealth CA-26 A94-101, prototype for the Commonwealth Sabre series as shown by the black prototype marking ahead of the roundel. The cannon muzzle in the nose shows the original pattern which was later modified in design to reduce the risk of gasses being ingested by the engine resulting in engine surge. Below: The same aircraft, A94-101 on display at the RAAF Point Cook museum showing to good effect the deployed leading edge slats. The emblem on the fin is that of CAC. Contrary to some reports the aircraft shown has not been retrofitted with the 6-3 wing.



The Sabre Mk.6s bought by Germany were brand new aircraft and followed the last RCAF Mk.6s down the Cartierville production line, with the final German aircraft being the last Canadair Sabre built, being completed on 9 October 1958. The aircraft were delivered to Germany by sea as crated subassemblies which were reassembled and test flown by Dornier at its Oberpfaffenhofen plant before being delivered to the Luftwaffe. Three German day fighter wings each eventually comprising three squadrons were equipped with the Sabre Mk.6, with Jagdgeschwader 71 (JG.71) at Alhorn being the first to form. Its first aircraft arrived on 6 June 1959 then once operational it moved to Wittmundhafen where it was fully established by 1963. The other two wings were JG.72 at Leck and JG.73 at Oldenburg which formed shortly after one another, and all three continued operating the Sabre until the mid-1960s by which time it was completely outclassed as a fighter.

In an effort to extend the useful life of the Sabre Mk.6 many aircraft were modified during their last years of front-line service to carry a single AIM-9 Sidewinder infra-red homing missile on a light stores pylon below each wing, inboard of the drop tank pylon. At least some of the Mk.6s also seem to have been fitted with a Martin-Baker Mk.5 ejection seat in place of the original North American T-14E seat but when this was actually carried out is uncertain. This British seat was of a more sophisticated design and had the additional advantage that ejection was possible through the Plexiglas canopy thereby reducing escape time. Some authorities state that the German aircraft were built with this type of ejection seat and that it was also fitted to the Sabre Mk.5s as part of their overhaul by Scottish Aviation prior to delivery to Germany. However, other sources ascribe the installation of the Martin-Baker seat to a later modification carried out to the Sabre Mk.6s only, once they were in service and came due for major overhaul, and this seems the most likely case.

The early 1960s saw the start of a major re-equipment programme for the Luftwaffe involving the introduction of the F-104G Starfighter in both the air defence and fighter-bomber roles, and the Fiat G.91R in the newly introduced light attack role, both of which affected the Sabre wings. From 1961 the first Starfighters went to the fighter-bomber wings to replace their F-84F Thunderstreaks but in 1964 JG.71 was re-equipped with the F-104, forming the new 713 Staffel to continue operational duties with the Sabre while the original two squadrons were converting, on completion of which it was disbanded. However, JG.72 and JG.73 were given a role change in 1964 when they were initially redesignated fighter-bomber wings (Jagdbombergeschwader) and adopting the temporary titles JaboG.43 and JaboG.42 respectively. With the arrival of the first Fiat G.91s in 1965 they finally became light attack wings (Leichtkampfgeschwader) LeKG.43 and LeKG.42. In each case one squadron began conversion to the Fiat G.91 while the other continued Sabre operations, then it too converted once the first squadron had achieved operational status, with the last Sabres reportedly being phased out by the end of 1966.

Thereafter small numbers reportedly remained in service as late as 1966 for tactical training purposes, and although they were reported as having been withdrawn by 1967 a few Sabres were still used for trials and other special tasks into the 1970s. The main trials organisation was Erpobungsstelle 61 (ESt.61) at Manching which operated a variety of types including Sabres on all manner of test and evaluation work, and Messerschmitt, also at Manching, used at least one - 'KE-105' - as a chase aircraft. The Sabres were also used by Condor Flugdienst, a civilian contractor who operated the Schiessplatzstaffel at Sylt on behalf of the Federal Ministry of Defence. Here, together with other types such as the Canberra, the Sabres were used for target-towing duties for which they were specially fitted with the Del Mar SK-460 towed target system. From 1966 Dornier modified seven Sabres as target tugs with the winch pod being mounted on the port underwing pylon whilst the target itself was carried on a rail fitted outboard of the pod. Once released, the target could be towed some 25,000 ft (7,620 metres) behind the aircraft and used for both air-to-air and surface-to-air gunnery practice. From 1970 Germany began to take delivery of OV-10B Broncos for target-towing duties as replacements for the Sabre, and once these had all received the necessary modifications the last Sabre was phased out during the spring of 1974.

Not all of the Sabres withdrawn during the 1960s were broken up. In 1966 90 surplus Sabre Mk.6s were bought by a Swiss arms dealer on behalf of Iran and in due course they were delivered to the Imperial Iranian Air Force. However, hardly had they arrived in Iran than they were sent to Pakistan, ostensibly for overhaul and modifications. From that point the trail went cold and the aircraft were never seen again, not until, that is, they emerged from overhaul in PAF markings. It then became apparent that the whole thing had been a ruse on the part of the Pakistanis to obtain replacement Sabres to make good losses suffered during the 1965 war with India. It remains to be seen whether the German government knew at the time, or even suspected that their Sabres were to be used for this purpose. Brazil also expressed interest in acquiring some of Germany's Sabre Mk.6s at this time but nothing came of it.

Up until 1968 the Luftwaffe generally used manufacturer's construction numbers as the permanent means of identifying individual airframes rather than having a unified serial number system. For much of the time therefore, the Sabres' only permanent identification was their Canadair construction number marked on the fin in tiny characters underneath the Federal German national flag. This seems to have been presented in two ways, examples being 'F86-877', for 'F-86E c/n 877' (the former RCAF Sabre Mk.5 23087), and 'S6-1659' signifying 'Sabre Mk.6 c/n 1659'. During this period aircraft were identified within their unit by a large two letter and three figure code group painted on the forward fuselage, and these changed as the individual aircraft moved between units. The first letter denoted the wing mission and the second the wing itself, whilst the first number was the squadron identity and the last two showed the individual aircraft within the wing, generally with each squadron being allocated a block of 25 numbers. By way of examples, 'JA-120 was aircraft '20' of 1 Staffel (711 Sqdn) of JG.71, and 'JB-238' aircraft '38' of 2 Staffel (722 Sqdn) of JG.72.

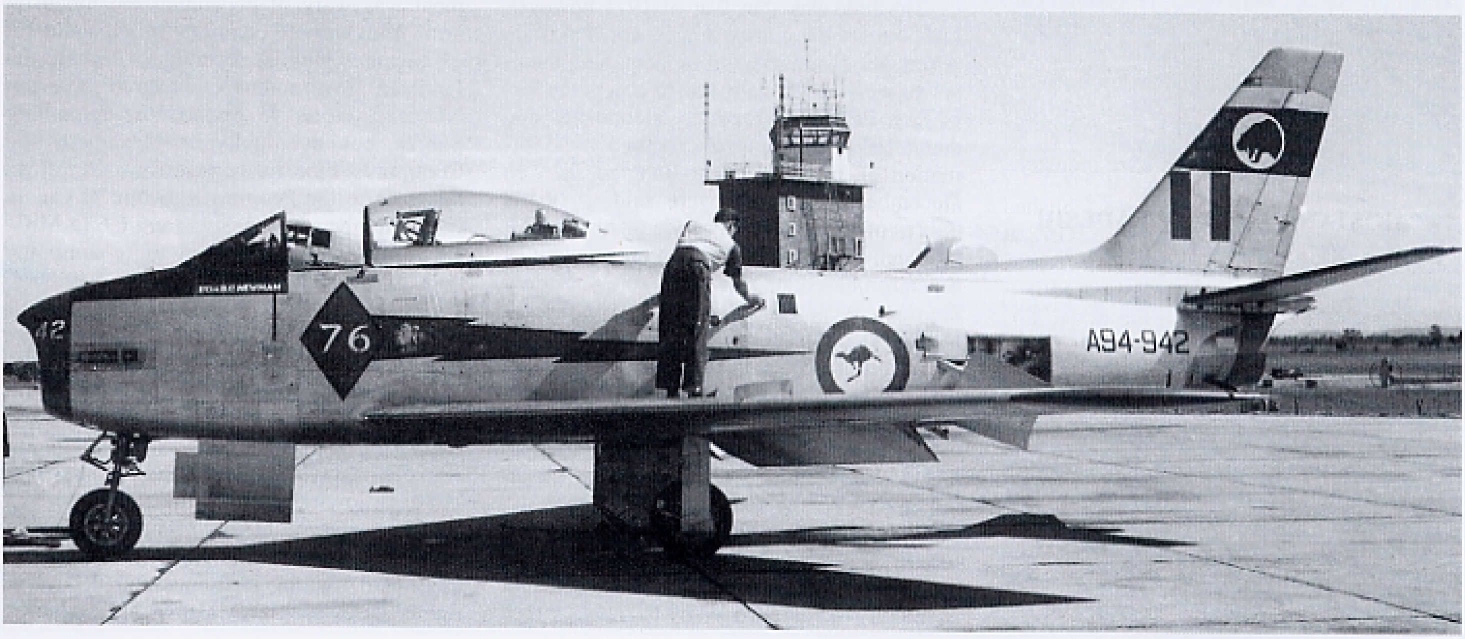
From 1 January 1968 however, a unified serial number system was introduced consisting of a four-figure group painted large on the fuselage side replacing the earlier wing code marking. Under this new system the first two numbers signified the aircraft type and the last two the individual airframe. When there were more than 99 separate aircraft of a single type the next consecutive prefix number group was used, and so on until all the airframes had been assigned a number. By the time this system came in most Sabres had been withdrawn but those still in use were assigned one of the new serial numbers in the range '0101-0113', with the first '0' signifying trials and experimental aircraft. However, this new number was not always immediately applied as shown by S6-1659 'KE-105' and S6-1613 'YA-042' which were still active in 1969 with only their old fuselage codes marked. When the Sabres did eventually leave the Luftwaffe inventory seven continued to be operated as target tugs on behalf of the Federal Government with restricted-use civil registrations such as D-9542 (ex.'0110', c/n S6-1740).

OTHER EXPORTS

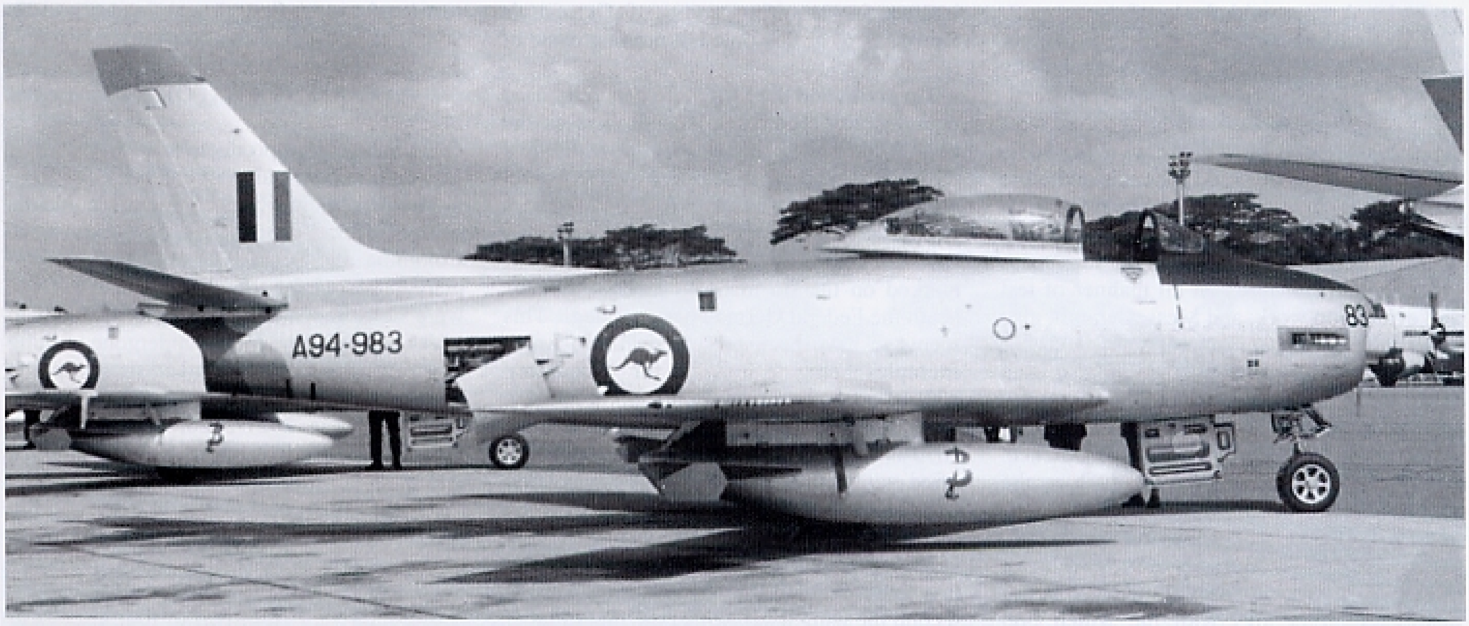
Once Sabre Mk.6 production was well under way and sufficient aircraft had been delivered to the RCAF in Europe, aircraft could be spared from production for export to Colombia and South Africa. All six aeroplanes ordered for the Colombian Air Force were delivered in June 1956 by Colombian pilots who had previously undergone training at Cartierville. They went to the Grupo de Combate at Palanquero, being allocated the serial numbers 2021-2026, and were later joined by a small batch of F-86Fs supplied under the US MDAP. Little is known about their activities but they almost certainly included operations against communist rebels as well as border skirmishes with Colombia's immediate neighbours. The surviving Sabres, and reports vary from two to four aircraft of undisclosed variants, were eventually withdrawn from service in 1966 most probably due to lack of spares. However, no replacement fighters were actually delivered to the Grupo de Combate until around 1972-73 when Mirage 5s arrived.

When South Africa placed an order for 34 Sabre Mk.6s the South African Air Force (SAAF) already had experience of flying the Sabre, having been loaned enough F-86Fs in 1953 to equip 2 Squadron which took part in the fighting in Korea as part of the UN force. The squadron was attached to the USAF 18th Fighter-Bomber Wing and during the course of the fighting lost two of its aircraft to ground fire. Impressed by the Sabre's performance the SAAF looked at the various versions of the aircraft available and settled upon the Canadair Sabre Mk.6 as being best suited to its needs which were primarily for air defence with a secondary ground-attack role.

The first of the 34 aircraft ordered were delivered by sea in 1956 and went to re-equip numbers 1 and 2 Squadrons at Waterkloof, where they had both previously flown Vampires, with 17 aircraft being allocated to each squadron. Like the Colombian Sabres



RAAF Sabre Mk.31 A94-942 of 76 Squadron visiting RAAF Richmond in February 1963. The squadron colours on the nose, fuselage and tail are red and black. (APN)



This Sabre Mk.32 is fitted with 167 imperial gallon ferry tanks on the underwing pylons. The emblen on the tank possibly identifies the parent unit as 3 Squadron, but if so the Sidewinder missile rails are conspicuously absent. (APN)

these aircraft were actually diverted from the RCAF order, so besides their SAAF serial numbers 350-383 they originally had Canadian serials as well. In June 1963 2 Squadron began to receive the more potent Mirage IIICZ and the following year passed its few remaining Sabres on to 1 Squadron. In 1967 1 Squadron moved to Pietersberg but because of the UN arms embargo imposed on South Africa it would be some considerable time before the squadron was able to re-equip.

By 1973 there were about 18 Sabres left with 1 Squadron then the following year they were augmented by some MB326M Impalas to take the load off the Sabres and extend their useful life. During this period a number of Sabres were refurbished and transferred to No. 85 Advanced Flying School, also at Pietersberg, where they were used to give operational flying training and low-level tactical flying experience to all the SAAF's jet pilots. Eventually in 1975 1 Squadron began to re-equip with the MB.326K Impala II ground-attack aircraft as interim equipment prior to receiving the Mirage F.1AZ, and its remaining Sabres went to 85 AFS which continued to operate them alongside MB.326s until 1979 when they were finally replaced by Mirage IIIs. Following their withdrawal, in 1980 about ten Sabres were bought by Flight Systems Inc. based at Mojave, California, for contract work with the US defence industry.

PAKISTANI AND BANGLADESHI SABRES

In 1954 Pakistan entered into a Mutual Defense Assistance Alliance with the USA as a result of which the US government began to supply military equipment to the Pakistani armed forces. From late 1954 the Pakistan Air Force (PAF) began to receive F-86F Sabres and these formed the mainstay of Pakistan's fighter-bomber squadrons, eventually going to equip some seven front-line units as well as the Fighter Conversion School and other support units. There was always tension with India however, with frequent border incidents, and on a number of occasions these developed in to open warfare. Following the war of 1965 there was an arms embargo imposed upon Pakistan which seriously affected the PAF both in the supply of spares for its aircraft and in making good war losses, and this prompted the government to look to other nations who were willing to supply its needs. At the time there were surplus Sabre Mk.6s available in Germany so long as one knew the right people, and during 1966 Pakistan was able to obtain 90 of these via international arms dealers and with the connivance of the Iranian government which, like Pakistan, was an Islamic state and a member of the Central Treaty Organisation (CENTO).

After overhaul in Pakistan the Canadair Sabres went to replace F-86Fs with 14, 17 and 18 Squadrons of the PAF as well as equipping the newly formed 19 Squadron, and the F-86Fs thus released went to bring the other Sabre squadrons back up to strength. Some of the Sabre Mk.6s probably also went to the Fighter Conversion School at Peshawar to operate alongside F-86Fs to give conversion training to prospective Sabre pilots, as well as giving operational training to all PAF jet pilots before being posted to front-line squadrons. These aircraft appear to have been identified by their Canadair construction number during Pakistani service.

The Indo-Pakistan War of 1971 however, had disastrous consequences for Pakistan. Although its armed forces acquitted themselves well it eventually had to accept the loss of East Pakistan where the internal uprising supported by Indian forces resulted in the formation of an independent Bangladesh. In December 1971 there were said to be 88 Sabres of all versions in service with the PAF of which 16 Sabre Mk.6s were operated by 14 Squadron based at Dacca-Tezgaon, providing the main air defence and ground-attack force in East Pakistan. Once fighting began 14 Squadron succeeded in shooting down a number of attacking Indian aircraft for the reported loss of five of their own. However, within twenty-four hours of hostilities starting the airfield had been rendered unusable by Indian air attacks on the runways but because the Sabres had been well camouflaged and protected they survived with remarkably little damage. Even so, at least 11 of them had eventually to be destroyed by Pakistani forces before the surrender of Dacca on 14-15 December to prevent them falling into Indian and rebel hands. At the end of the fighting there were about 60 Sabres left with the PAF.

Following the surrender of Pakistani forces in East Pakistan Indian and Bangladeshi troops found some five Sabres at Tezgaon which, although they had been shot up by the Pakistanis, looked capable of being repaired using local ingenuity and parts from the other wrecked Sabres. Eventually three were repaired and were flying again by April 1972, being joined by a repaired T-33A by the following year. Together these four aircraft constituted the combat element of the fledgling air component of the Bangladesh Defence Force, but they were little more than a token force established as a symbol of national independence. They were flown by former PAF pilots but by the second anniversary of Bangladeshi independence all were grounded through lack of spares and probably never flew again. During 1973 the Bangladesh government was able to replace the Sabres with MiG-21Fs which had been supplied by an only too willing Soviet government.

When the arms embargo on Pakistan was lifted in 1973 aircraft spares began to be delivered once more and aircraft serviceability improved, but from now on the government was wary of depending too much on arms from western countries which could cut off supplies without warning. Initially the Pakistan government considered ordering Northrop F-5Es to replace the remaining Sabres but eventually it turned to the Communist bloc for replacement aircraft, in this case to the People's Republic of China. Large numbers of the Shenyang F.6 (a MiG-19 variant) were delivered to re-equip the bulk of the PAF's air defence and ground-attack squadrons including a reconstituted 14 Squadron which reformed in 1973. By the end of the 1970s all four front-line Sabre Mk.6 squadrons had been re-equipped with Shenyang F.6s, with the last unit to fly the type being based at Masroor. The remaining Pakistani Sabres were eventually grounded in 1980 following a growing incidence of fatigue-related problems, primarily affecting the wings, but thereafter many were still used as ground training airframes and decoys at fighter bases such as Masroor and Peshawar until at least the mid 1980s.

COMMONWEALTH AIRCRAFT CORPORATION CA-27 SABRE

After the end of World War 2 Australia found itself in much the same position as Canada, with the need to re-equip its air force with modern jet fighters. The main difference for Australia however, was that the end of the World War did not mean an end to the fighting in South-East Asia. Here varying groupings of nationalist and communist forces continued fighting either to challenge the former colonial powers who were trying to re-establish their authority once the Japanese occupation ended, or else to replace the post-war governments with ones more to their own liking. As a result the political situation in much of South-East Asia remained tense and uncertain.

COMMONWEALTH AIRCRAFT CORPORATION CA-26/CA-27 SABRE PRODUCTION

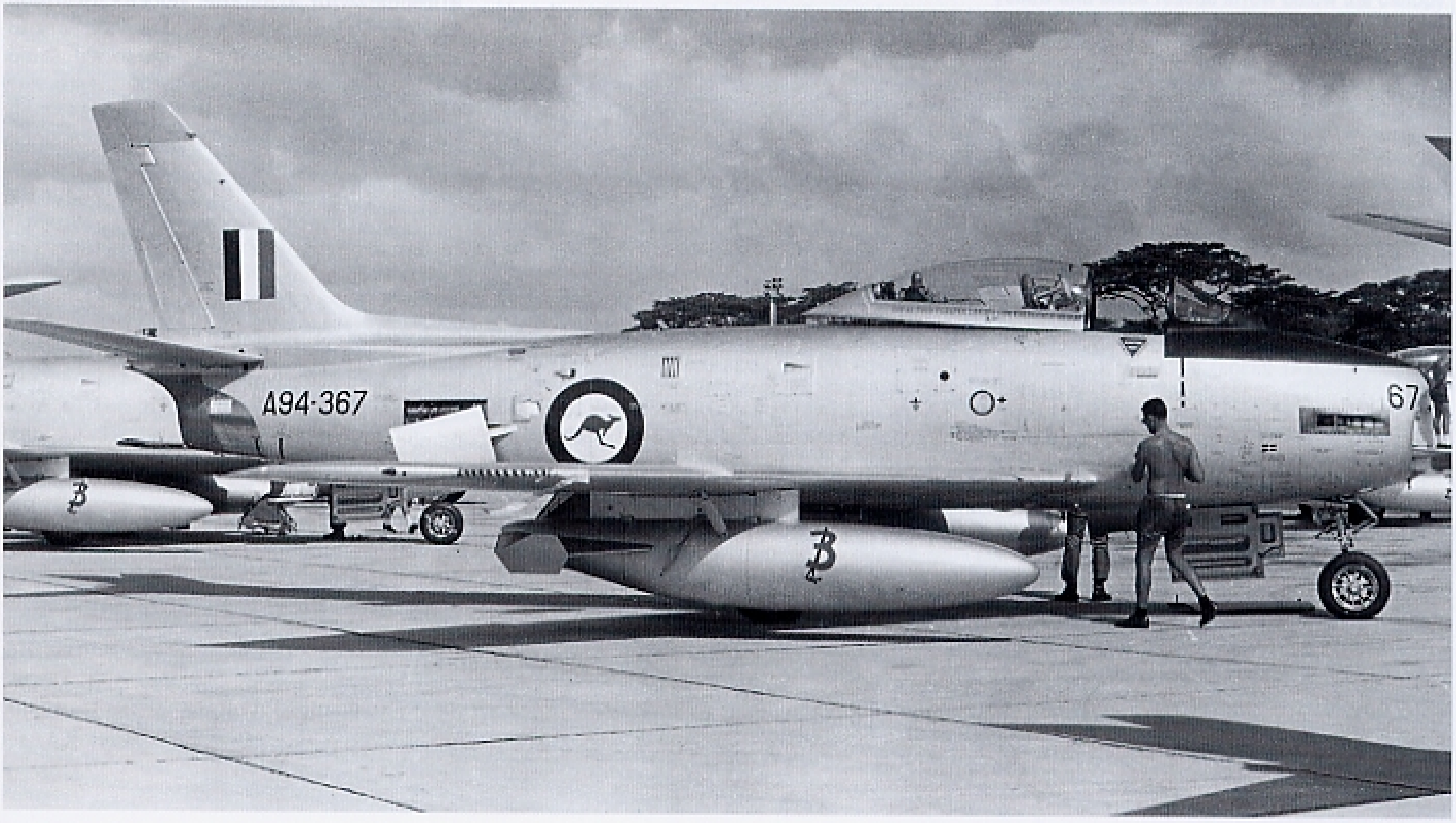
Type	Serial numbers	Numbers built	Construction numbers
CA-26	A94-101	1	1428
CA-27 Mk.30	A94-901 to -922	22	CA.27-1 to -22
(most Mk.30s were eventually converted to Mk.31 standard)			
CA-27 Mk.31	A94-923 to -942	20	CA-27-23 to -42
CA-27 Mk.32	A94-943 to -990 A94-351 to-371	69	CA-27-43 to -111

To begin with the Australian government looked towards the UK for assistance and as an interim measure acquired DeHavilland Vampire fighters pending the availability of more advanced aircraft. Having evaluated various British fighter projects the Australians eventually selected the Hawker P.1081, a Tay-powered version of the P.1052 swept-wing Sea Hawk which was to be built under license in Australia by the Commonwealth Aircraft Corporation at Fisherman's Bend near Melbourne, Victoria. However, with no likelihood of British orders for the P.1081 Hawker was forced to abandon the project, and work on the Australian version was terminated in November 1950. This effectively left the Royal Australian Air Force (RAAF) with having to make a rapid choice between the Hawker Hunter and the North American F-86, these being the only two swept-wing jet fighters available at the time. Even then production Hunters would not be ready for several more years so the choice fell inevitably upon the Sabre.

The situation had become more urgent with the outbreak of the Korean War in 1950 and in order to meet its commitments the Australian government asked the USA for the loan of sufficient F-86s to equip a fighter squadron to support the UN operation. This was refused however, on the grounds that there were insufficient Sabres to meet the USAF's needs at that time, so the RAAF had to make do with Meteor F.8s supplied by the UK. These proved dependable but were no match for the communists' MiG-15s whereas the USAF's F-86s acquitted themselves well, confirming to the Australians that their choice of the Sabre was the right one. In February 1951 it was formally announced that the Sabre had been selected to become the RAAF's future jet fighter replacing both the Vampire and Meteor, and that subject to a satisfactory license agreement being concluded the aircraft would be built in Australia by the Commonwealth Aircraft Corporation. Soon afterwards an Australian mission visited Inglewood to finalise the license agreement, accompanied by Commonwealth engineers who went to gain first-hand experience of Sabre production and to assess how best to set about modifying the aircraft to meet Australian requirements. The Australian government then placed an order with North American for 100 sets of major sub-assemblies for shipment to Fisherman's Bend where they would form the basis of the Australian Sabre production line. Once this was running it was planned gradually to increase the amount of Australian-manufactured components supplying the line until eventually the American input became minimal.

THE AUSTRALIAN SABRE

The Commonwealth Sabre was to be based upon the early F-86F-1-NA with the original leading edge slats and single wing pylon, but from the beginning it had been decided that the Australian version would be specifically tailored to RAAF needs even though this would delay its introduction into squadron service. Eventually, by the time the prototype had been built, some 60 per cent of the fuselage structure had been re-designed to accommodate all the necessary changes. There were the inevitable minor equipment alterations as well as a revised cockpit layout, but the most significant changes involved the aircraft's engine and armament. The original J47 engine was replaced by the more powerful Rolls-Royce Avon RA.7 rated at 7,500 lb s.t., which was also to be built under license by CAC. Because this was shorter and of greater diameter than the American engine, besides being some 400 lb (181 kg) lighter, drastic redesign of the engine bay was necessary both to accommodate the engine and its accessories



Possibly one of the RAAF deployment aircraft seen at Butterworth, Malaysia. The unit is more than likely to be from 3 Squadron because of the marking on the wing tank. (APN)

and to preserve the aircraft's original centre of gravity. The internal structure of the after fuselage also had to be redesigned in order to take the Avon's larger jet-pipe and to ensure that tail stress loads were borne by the fuselage structure and did not distort the jet-pipe.

The engine itself was located farther aft in a shortened fuselage so the break line between the two fuselage sections also had to be moved back some 27 inches (68.6 cm). In order to counterbalance this the forward fuselage was extended by a similar amount so maintaining the same overall fuselage length, and there was also some repositioning forward of internal equipment. The Avon also required a greater mass of intake air entering the engine so in order not to interfere with the existing cockpit structure the forward intake trunking had to be deepened. This was achieved by inserting a horizontal splice about three inches (8.9 cm) thick along the trunking and also deepening the forward fuselage by a similar amount, as well as by making the nose intake aperture larger, modifications something along the lines of those applied to the USAF's F-86H.

Besides the engine changes necessary, the Australian Sabre had a completely new main armament with the original six 0.5 inch machine guns being replaced by British-designed cannon of larger calibre. This was largely the result of observations made during the Korean War that the machine guns lacked lethality both during aerial combat and in ground attack operations. Consequently it was originally planned to fit the Sabre with four 20 mm Aden cannon instead, but this was subsequently revised to two 30 mm cannon, one either side of the intake in the forward fuselage. In order to keep the ammunition feed from the magazine to the breech mechanism on the outboard side of the cannon, the port gun had to be mounted inverted, but because of the internal layout of the fuselage it also had to be positioned eight inches (20.3 cm) farther forward than the starboard gun. As each gun fired at up to 1,400 rounds a minute with a muzzle velocity of 2,600 ft/sec (792.5 m/sec) it was also necessary to strengthen the forward fuselage to withstand the extra stresses to which the structure was subjected. The magazines had a maximum capacity of 180 shells each and remained positioned low on the forward fuselage sides with the shells being fed electrically directly upwards to the gun breech. The spent shell cases and ammunition links were collected in a tank at the front of each magazine bay.

Work on the CA-26, the designation for the prototype CAC Sabre, began at Fisherman's Bend in 1952 with licensed production of the Avon engines starting the following year. The prototype Sabre with the RAAF serial number A94-101 was completed in July 1953 and began ground runs of its imported Avon RA.7 Mk.20 engine soon afterwards. Following a series of taxi runs and general ground handling manoeuvres the aircraft was dismantled and moved by road the 40 miles (64.36 km) to RAAF Avalon to begin flight testing, a procedure followed by all subsequent Sabres. Once reassembled A94-101 recommenced ground handling and engine tests then finally took off on its maiden flight on 3 August piloted by Flt Lt W Scott, RAAF.

OTHER SABRE SERIAL NUMBERS

Bangladesh: Sabre Mk.6 (approx. 5) former Pakistani aircraft but identities unknown.

Federal Republic of Germany: Sabre Mk.5 (75) including F.86-798, -877, -921, -1095(?), -1111.
Surviving Luftwaffe Sabre Mk.6s given new serials on 1 January 1968: 0101 to 0113 (c/n 1591, 1593, 1605, 1613, 1659, 1664,1668, 1711, 1715, 1740, 1746, 1760, 1765).
Sabre Mk.6s given restricted use civil registrations: D9522 to 9523 (c/n 1601, 1784) and D9538 to 9542 (c/n 1600, 1603, 1616, 1710, 1740).

Greece: Sabre Mk.2/F-86E(M) (104) 19102, '104, '105, '107 to '111, '114, '121, '125, '127, '128, '133, '135, '140, '141, '144, '146, '148, '151, '154, '161, '168, '169, '171, '172, '174, '182, '186, '188, '191, '196, '199, '202, '205, '209 to '213, '218, '220, '222, '224, '228, '233, '235, '238, '239, '243, '250, '254, '267, '269, '271, '273, '276, '278, '285, '287, '293, '294, '305, '307, '320, '323, '344, '347, '349, '355, '363, '377, '378, '381 to '383, '390, '392, '393, '395, '397, '398, '403, '407, '409, '416, '418, '423 to '425, '428 to '430, '432 to '434, '438, '440, '443, '444, '447, '448, '452. Also 19274 reported, but this probably went to Turkey.

Honduras: Sabre Mk.4/F-86E(M) (8) 3001 to 3008. (2 more also reported, incl. 3009, but these were probably F-86Fs).

Indonesia: Sabre Mk.32 (24) F-8601 to F-8619 at least.
Other aircraft delivered for which Indonesian numbers are not known are A94-370, FM1978, FM1979, FM1987 and FM1993. Of the total 3 are known to have become ground instructional airframes as TS-8603, TS-8609 and TS-8614.

Italy: Sabre Mk.2/F-86E(M) (1) 19404.
Sabre Mk.4/F-86E(M) (179) including 19455(?), '460, '464, '470, '474, '476, '477, '481, ,482(?), '483, '484, '487, '488, '490, '491, '493, '498 to '500, '503, '505, '506, '508, '509, '511, '512, '516, '520, '521, '523, '525, '528, '534, '542, '544, '548, '550, '551, '552(?), '555, '560, '565, '570, '571 to '574, '578, '579, '581, '582, '584, '588, '595, '596, '598 to '602, '607, '611, '616 to '618, '620, '625, '627, '628, '630, '632, '633, '635, '636, '638, '645, '647, '649, '652, '654, '658, '659, '664, '666, '668, '671(?), '672, '675, '680, '682 to '685, '687, '690, '691, '694, '695, '709, '716, '720, '722, '724, '733, '749, '752 to '754, '766, '775, '778, '780, '782, '784, '792, '798, '804(?), '820, '822, '828 to '830, '835, '836, '838, '839, '841, '843, '844, '848, '851 to '853, '858, '866, '868, '870, '874, '876, '877, '881, '884, '887, '888.
Also reportedly used were 19519, '535, '547 and '856, but these probably went to Yugoslavia rather than to Italy.

Malaysia: Sabre Mk.32 (18) FM1902 to '1905 (ex. FM1362 to '1365), '1907 (ex. FM1367), '1909 (ex. FM1369), '1911 (ex. FM1371) '1946, '1948, '1978, '1979, '1983, '1987, '1993 (ex. FM1353), '1994 (ex. FM1354), '1996, '1997 (ex. FM1357), '1999 (ex. FM1359).

Pakistan: Sabre Mk.6 (90) including: 1622, 1627, 1634, 1656,1690, 1702, 1728, 1739,1747, 1751, 1776, 1777, 1783, 1789, 1790, 1792, 1810.

Turkey: Sabre Mk.2/F-86E(M) (approx. 110) 19103, '120, '124, '126, '129, '130, '134, '136, '138, '139, '142, '147, '150, '153, '157, '160, '162, '164 to '166, '170, '173, '175, '176, '179, '180, '183, '184, '190, '192, '194, '195, '197, '198, '203, '207, '214 to '217, '223, '226, '227, '230 to '232, '236, '237, '241, '242, '247 to '249, '268, '270, '274 (also reported wilh Greece), '275, '286, '289, '301, '315 to '318, '325, '335, '337, '338, '342, '353, '354, '359, '364, '371, '373, '374, '376, '379, '380, '385 to '387, '389, '391, '394, '396, '399, '401, '405, '406, '408, '410, '412 to '415, '417, '419 to '421, '427, '431, '435, '437, '439, '441, '445, '446, '449 to '451.

United Kingdom: Sabre Mk.2 (3) XB530 to 532.
Sabre Mk.4 (438) XB533 to 551, XB575 to 603, XB608 to 650, XB664 to 713, XB726 to 775, XB790 to 839, XB851 to 900, XB912 to 961, XB973 to 999, XD706 to 736, XD753 to 781.
F-86E(M) G-ATBF (ex. XB733/Italian 19607), 9227M (ex. XB812/Italian 19666).

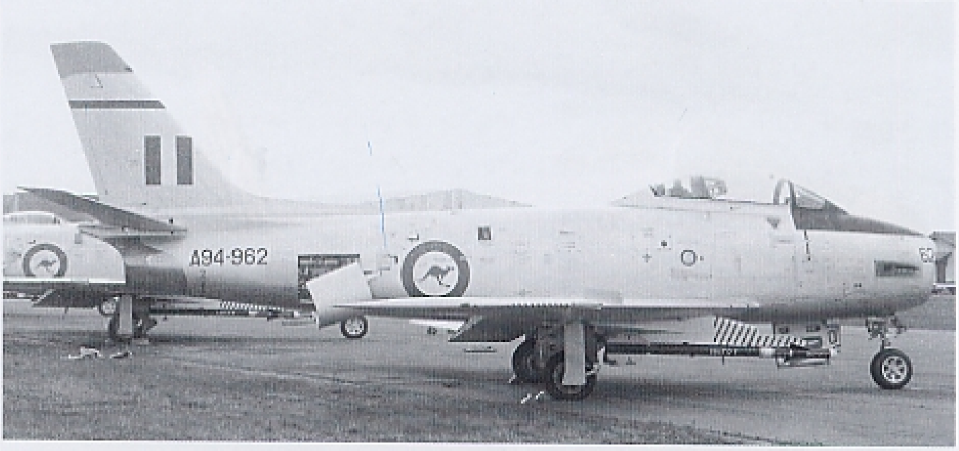
United States: Sabre Mk.2/F-86E-6-CAN for USAF (60) 52-2833 to -2892.
Sabre Mk.4 for supply to RAF (60) 52-10177 to -10236.
Sabre Mk.5 converted to QF-86E-CAN (approx. 56) or held for conversion included: 23021 (N1049D), 23028 (N99605), 23034 (N1046G), 23036 (N1046P), 23058 (N1046S), 23096 (N74180), 23097 (N5591C), 23102 (N63551), 23106 (N5591F), 23128 (N96123), 23129, 23133 (N96120), 23135 (N92426), 23146 (N5591K), 23147 (N72491), 23151 (N5591L), 23160 (N5591M), 23190 (N98230), 23195 (N5591N), 23198 (N5591S), 23202 (N55911), 23203 (N201X), 23206 (N5592D), 23207 (N5592K), 23208 (N46869), 23209 (N4688J), 23215 (N2291B), 23222 (N46882), 23223, 23224, 23226 (N46883), 23227 (N2290R), 23238, 23259, 23241 (N8544), 23252 (N96122), 23259 (N98250), 23268 (N96125), 23280 (N2290V), 23283 (N2290E), 23289 (N99594), 23291 (N70726), 23293 (N4689H), 23300 (N4724A), 23303, 23306 (N306X), 23308 (N4724N), 23309 (N92473), 23310, 23315 (N72492), 23320 (N74170), 23323 (N98279), 23331 (N46901), 23338 (N4689N), 23339 (N46791), 23344, 23351, 23352 (N98270), 23358 (N4690J), 23363 (74180). N98275 and N99175 also registered to unknown FSI Sabres for drone conversion. 23228, 23236, 23316, 23330, 23332, 23334, 23335, 23347 and 23367 also reported at Mojave but these are possibly based upon erroneous reports or mis-painting of RCAF number.
Sabre Mk.6s possibly converted to special configuration for USA N186FS (23454, N186F), N3841V (SAAF 350, later painted as '23669'), Unidentified Sabre painted as '23668'.
Sabre Mks.5/6s used by civilian defence contractors or for private use included: N80FS (c/n 1675), N81FS (c/n 1593), N82FS (c/n 1600), N83FS (c/n 1666), N86EA (23223), N86EB (23238), N86EC (23344), N86ED (23351), N86FS(23367), N87FS (SAAF 382), N89FS (c/n 1710), N91FS(23231, ex. N231X), N92FS (23285), N93FS (23347), N186JC (c/n 1600), N186X, N38301 (SAAF 352), N3831B (SAAF 359), N3842H (SAAF 363), N3842J (SAAF 371), N3844E (SAAF 373), N38453 (SAAF 378), N3846J (SAAF 380), N8686F (23096).

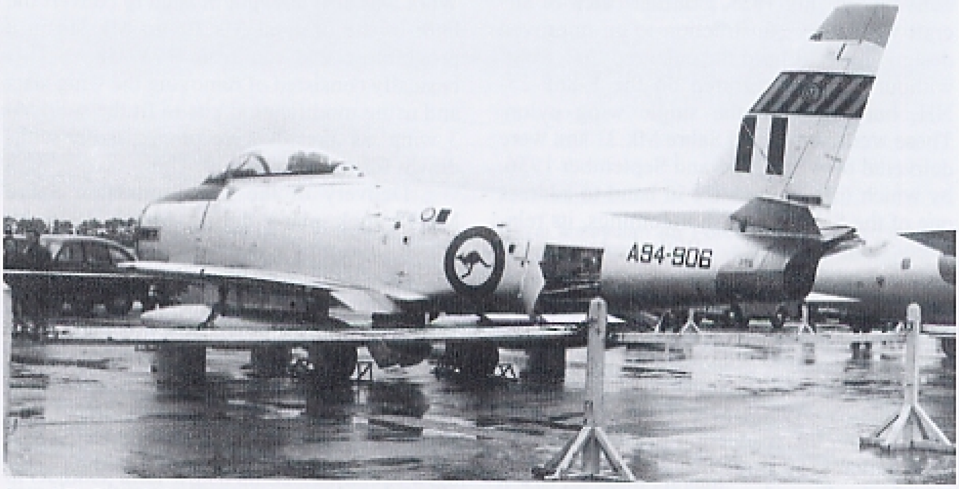
Yugoslavia: Sabre Mk.4/F-86E(M) (approx. 121) 11001 to 11121, with last 80 originally serialled 06001 to 06080.

Company trials continued for a year after which A94-101 was delivered to the Aircraft Research and Development Unit (ARDU) at RAAF Laverton, Victoria for full service trials to be carried out. These continued until 1955, and on completion of its test flying career the CA-26 was eventually relegated to ground instruction duties. The only significant problem encountered during these trials was a tendency for the aircraft to pitch up under certain flight conditions but this was remedied on A94-101 by the addition of 80 lb (36.29 kg) of ballast to the nose. On production aircraft the centre of gravity was brought forward slightly by repositioning some internal equipment farther forward.

Meanwhile production Sabres began to leave the assembly line in mid-1954 with the first one making its maiden flight from Avalon on 13 July. The first batch reportedly consisted of 22 aircraft designated the CA-27 Sabre Mark 30 and with the serial numbers A94-901 to -922, all powered by imported Avon RA.7 Mk.20 engines whereas subsequent aircraft were fitted with Avons built in Australia from imported components. These production Sabres had minor equipment changes but more significantly the Avon was provided with a self-contained starter unit together with its own one imp. gallon (4.55 litre) fuel tank, sufficient for three engine starts. This did away with the need for an external power supply for start-up and greatly increased the fighter's operational flexibility.

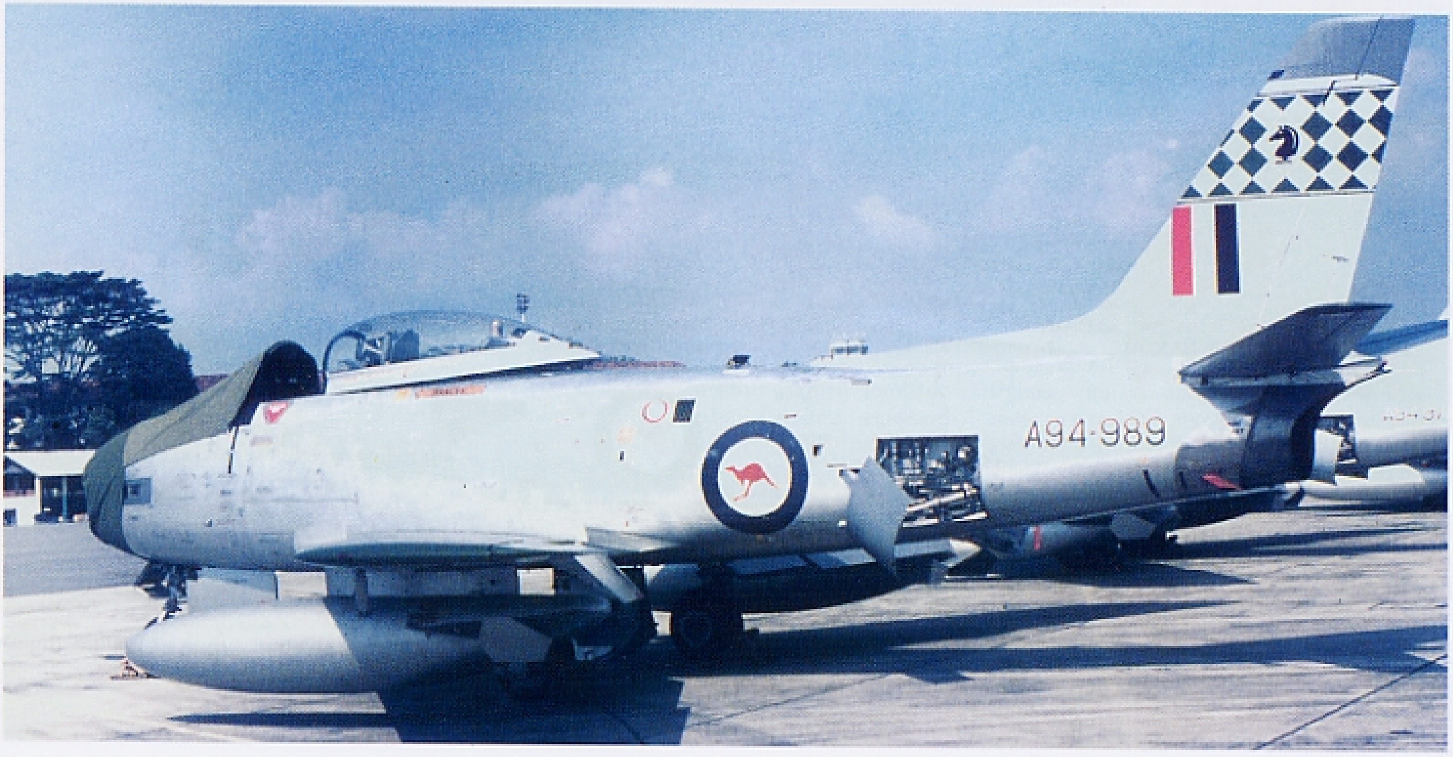
The first Sabre Mk.30 was handed over to the RAAF in August 1954 and underwent further service trials before going to RAAF Williamtown, New South Wales, which was due to become the main RAAF Sabre base. Aircraft deliveries were slow largely because the airframes and later the engines as well were being assembled from imported and locally manufactured components, and by the end of the year only five Mk.30s had been delivered. Some doubt exists, however, as to whether 21 or 22 Sabre Mk.30s were built. Most authorities give A94-922 as being the last Mk.30 whilst some claim that this was actually A94-921 and that A94-922 was the first production Mk.31. The matter is complicated by the fact that most Mk.30s were later modified to Mk.31 standard, but pictures exist which show A94-922 evidently lacking the wing fences introduced on the Mk.31, thereby supporting the case for its being a Sabre Mk.30.

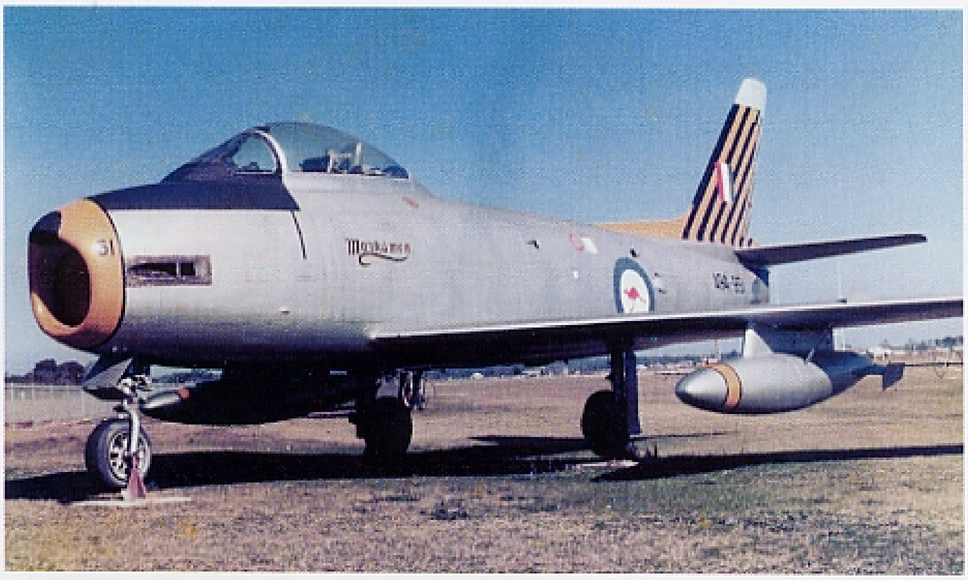




Above: A 79 Squadron Sabre Mk.32 A94-962 based at Ubon, Thailand. The only unit marking was a black band across the tail. (APN) Below: A Sabre Mk.31 A94-906 of 2(F) OCU Williamtown. The tail band is in yellow and black with the nose intake ring being in plain yellow edged in black. Not all aircraft with this finish carried the small motif on the fin band. The unit badge is marked below the anti-dazzle panel ahead of the cockpit step line. (APN)

A94-989, a Sabre Mk.32 of 77 Squadron based at Butterworth in September 1968. The fin band consists of dark green and white diamonds edged top and bottom in white then black, with a black and white Knight on a larger diamond panel also outlined in black. The nose ring intake was probably dark green with a thin white band around the rear edge. A newly introduced marking was the yellow and black rescue arrow below the canopy, pointing forward to the canopy jettison toggle. (Author)





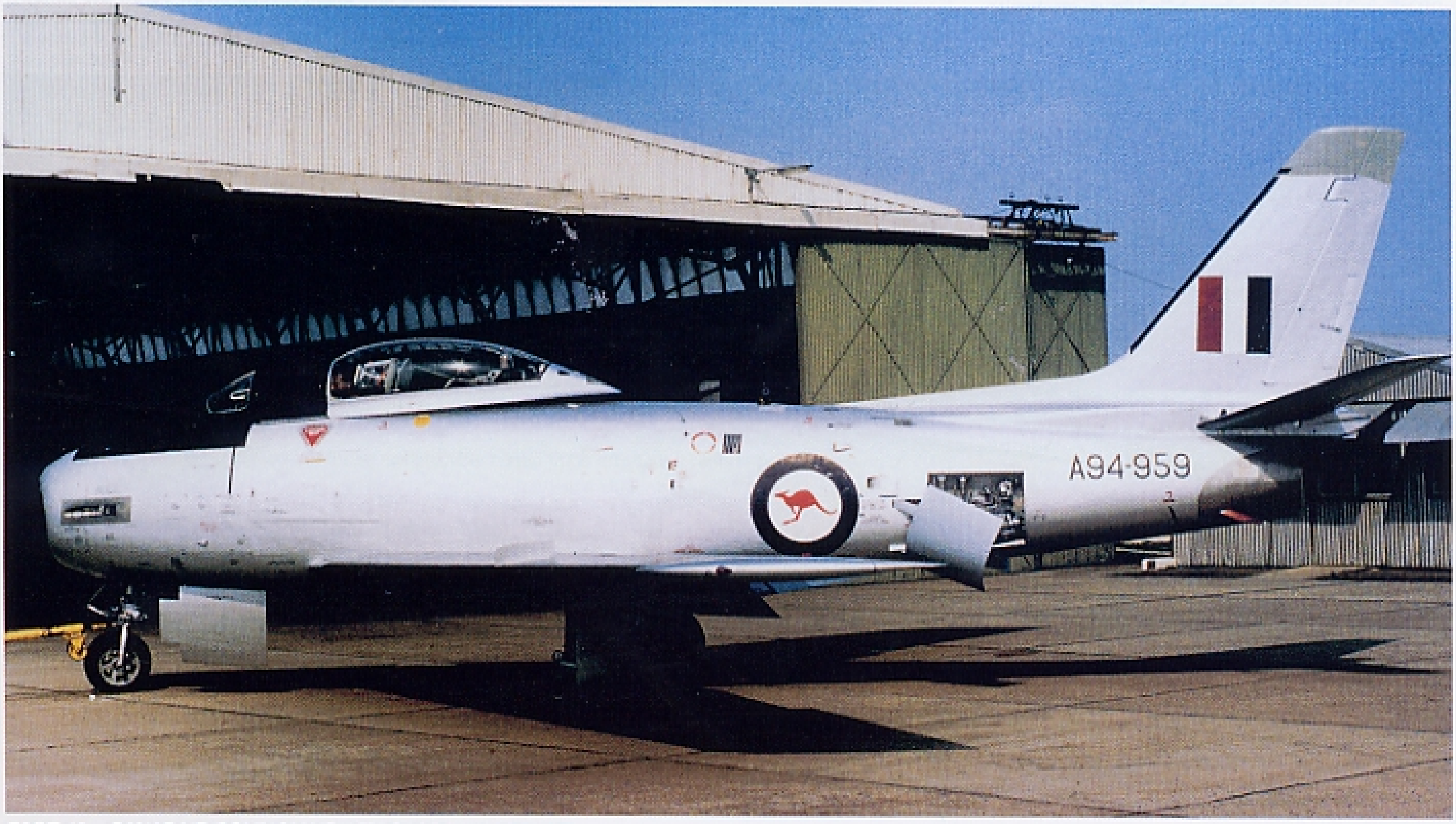
A preserved Sabre Mk.32 A94-951 in the colours representative of the 'Marksmen' display team of 2 OCU. Evident in this picture is the definitive design of the cannon muzzle on the nose side, and the single bracing strut between the drop tank and the wing underside, outboard of the pylon. (G.Madgewick)

By the time the final Sabre Mk.30 was delivered in July 1955 a further batch of aircraft was under construction to an improved design which utilised the enlarged '6-3 wing' without slats, as featured on the F-86F-25-NH, but still with the single wing pylon. These were designated Sabre Mk.31 and were delivered between 1955 and September 1956, by which time plans were in hand to address one of the Sabre's few shortcomings, its relatively short endurance. With the removal of the slats and the addition of the extended wing leading edge on the Mk.31 it was decided to experiment with various designs of leading edge fuel tanks which would take advantage of the otherwise empty wing extensions. Accordingly A94-938 and A94-942 were modified on the production line to have a 35 imp. gallon (159 litre) fuel cell incorporated into the leading edge extension of each wing to create the so-called 'wet' wing, thereby increasing the internal fuel capacity to 422 imp. gallons (1,918 litre). These were then used for front-line trials and as no significant problems were encountered this modification formed the basis for the third and definitive version of the CA-27, the Sabre Mk.32. Work was also now put in hand to convert the bulk of the original Mk.30s to Mk.31s in a programme that ran from 1957-58. This basically consisted of removing the wing slats and using modification kits to fit the solid '6-3 wing' as aircraft were progressively withdrawn for major overhaul.

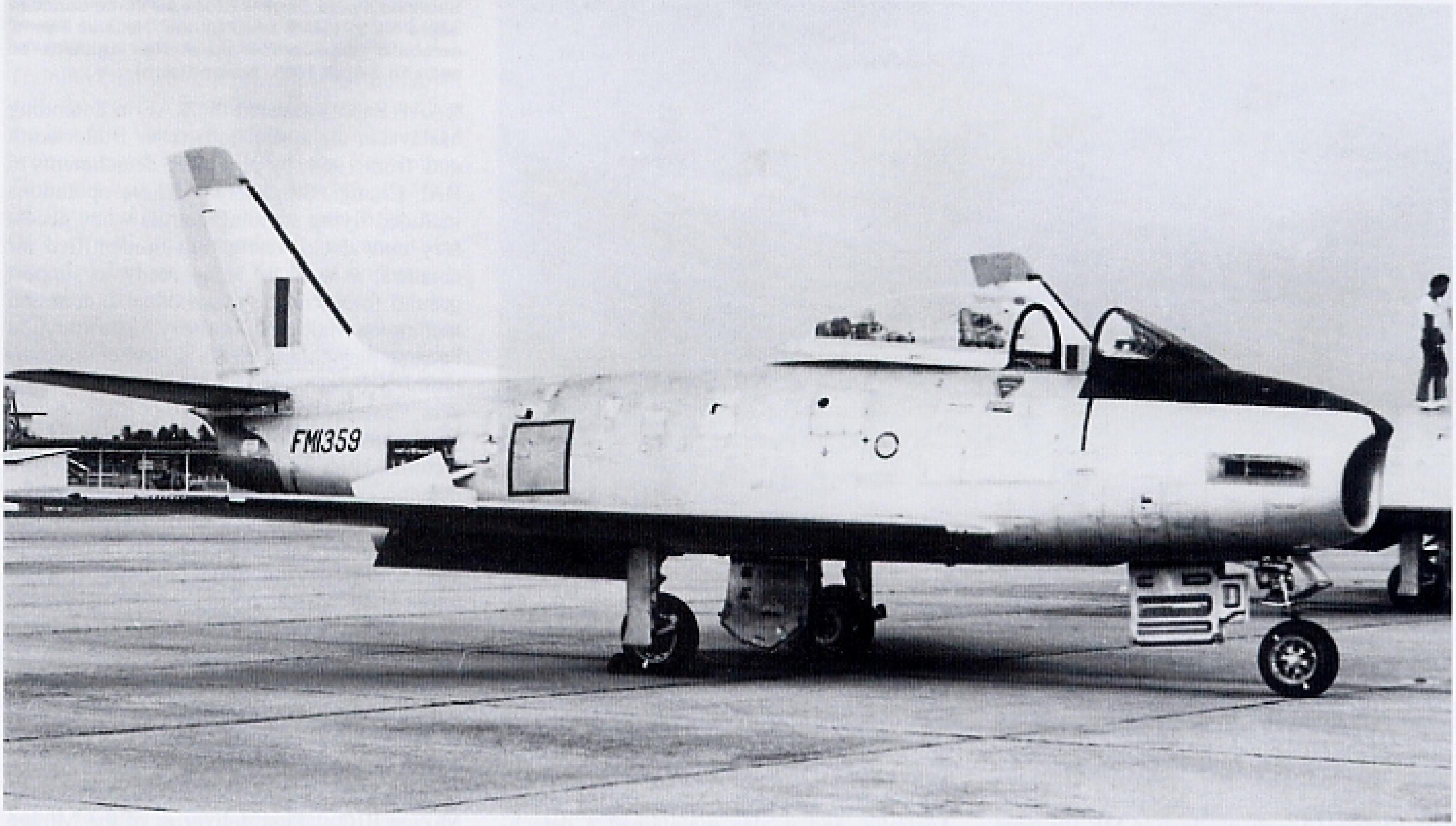
Delivery of the first production Sabre Mk.32 took place during March 1956 by which time production was running at three aircraft a month with plans to increase the rate later from four to five aircraft a month. However at this time a study was under way to select a successor for the Sabre and provisional findings indicated that licensed production of an Australian version of the Lockheed F-104 Starfighter would be the best option, so the production rate was then actually reduced to two aircraft a month. It was hoped that Sabre production could be terminated in the near future in favour of the F-104 but following more detailed study the government decided against the Starfighter project which was cancelled later in 1957. With the choice of a successor yet to be made a further 20 Sabres were ordered in 1957 so that production could continue, followed by a final order for 21 placed in 1959. Eventually 69 Sabre Mk.32s were completed with the last being delivered on 19 December 1961.

The Sabre Mk.32 featured the '6-3 wet wing' with provision for two pylons below each wing making the aircraft better suited to ground attack operations. The original outboard pylon was still plumbed to take either a 100 imp. gallon or a 167 imp. gallon drop tank, or underwing stores, whilst the inboard pylon was for the carriage of weapons only. On these aircraft changes to the internal structure of the wing front reduced the capacity of the leading edge fuel cells to around 30 imp. gallons (136 litres) each. This version was powered by the completely Australian-built Avon RA.7 Mk.26 engine which gave it a top speed of 608 kts (Mach .92) at sea level and which featured improvements on earlier engines such as an auto-throttle connection linked to the cannon trigger, designed to reduce the occurrence of engine surge when the guns were fired.

This had been a problem on the earlier Sabres under certain flight conditions caused by gun muzzle gases and shock waves being ingested by the engine causing it to surge. On the Mk.32 therefore, when the guns were fired the throttle was momentarily automatically closed slightly to minimise the chances



An unmarked Sabre Mk.32 A94-959 at Williamtown in October 1968, was probably from the Sabre pool and operated by 2 OCU. By this time the Sabres were painted overall aluminium silver except for the natural metal area around the jet exhaust and gun muzzle, and the black anti-dazzle panel and windscreen framing. They also had black adhesive strips applied to the leading edges to inhibit ice build-up and rain erosion damage. (Author)



Royal Malaysian Air Force Sabre Mk.32 FM1359, probably at Butterworth shortly after delivery. It is seen in its original aluminium finish with a black anti-dazzle panel (MAP)

of a surge. The cannon muzzle area was also redesigned to reduce the size of the forward blast plume during firings and this modification was subsequently also incorporated into earlier versions of the Sabre. A further modification introduced probably early in production, was that the spent shell cases and links were jettisoned through chutes in the fuselage underside rather than retained onboard.

A later modification made to most Sabre Mk.32s was to permit them to carry AIM-9 Sidewinder, infrared-homing air-to-air missiles, one on each inboard stores pylon. The Korean War had highlighted the fact that in the jet age guns as an air-to-air weapon were becoming increasingly ineffective, and that guided missiles offered the best hope of success for the future. As early as the mid-1950s the RAAF was conducting experiments at the Weapons Research Establishment, Woomera with Sabres armed with the British DeHavilland Blue Jay missile, which eventually went into production for the RAF as the Firestreak. At least two aircraft were involved, A94-915 and A94-922, which appear to have carried one missile beneath each wing on the existing pylon. In addition the associated missile services pack was housed within a fairing under the fuselage between the wings, presumably carrying amongst other things the supply of coolant required to cool the missile's infrared sensor head. The pack also appears to have been fitted with a blade aerial suggesting there was also some form of data link equipment carried so that data could be transmitted back to a ground station for immediate analysis. Trials were conducted between 1956 and 1959 and although the missile performed well it was not adopted by the RAAF, probably because it was relatively large and because the Sabre airframe could not easily be adapted to carry the full weapons system.

Instead attention turned to the somewhat smaller and more self-contained Sidewinder, which presumably was also cheaper than the Firestreak in view of the large numbers being built not only for the US forces but numerous other air forces as well. The trial installation was made to A94-946 with one missile being mounted on a special adapter shoe fitted to each inboard wing pylon, and the aircraft flew for the first time in this configuration on 30 July 1959. There then followed a successful series of test firings at the ARDU beginning in October, after which all Sabre Mk.32s were cleared to carry Sidewinders, the missiles themselves starting to arrive from the USA early the following year.

In view of the small number of Mk.32s built many earlier Sabres were reportedly also modified to allow them also to carry a pair of Sidewinders, for which field modification kits were produced. It is possible that this was done at the same time as wing strengthening was carried out, again using kits supplied by the manufacturer, following the discovery of wing fatigue problems on a number of Sabres during 1964. However, it is not clear whether this work entailed the installation of additional inboard wing pylons specifically for the missiles or whether they were carried on the existing pylons. Certainly once fitted the Sidewinder greatly improved the Sabre's potency as an air defence fighter and it was a relatively straightforward modification which was also carried out by several other Sabre-users during the 1960s.

During the course of the Sabre's front-line service a number of units formed aerobatic display teams, initially using standard squadron aircraft given special markings. Later however, and certainly by 1964, particular aircraft were modified to permit them to generate smoke during their display sequence. This modification appears to have involved the removal of at least the port cannon and the fitting of an oil tank in the gun bay. An external pipe was then run by a rather erratic route back along the port fuselage side so that the oil could be pumped into the hot exhaust gas to create white smoke. On Mk.31s the pipe re-entered the fuselage at a point close to the top of the roundel but on Mk.32s it ran right aft on the outside to curve around into the mouth of the exhaust. Whilst this arrangement was undoubtedly effective, it was far from elegant.

OTHER SABRE PROJECTS

Inevitably there were various feasibility studies undertaken to enhance the Sabre's performance, several along the same lines as those pursued by Canadair. Studies were carried out on fitting an afterburner or the improved 10,000 lb.s.t. Avon RA.14 engine, as well as a Napier Double Scorpion rocket motor mounted in a ventral pack to boost performance, but nothing seems to have come of these. An in-flight refuelling capability was also considered in the light of the sheer size of Australia and the RAAF's commitments in South-East Asia. For this it was proposed to fit strengthened drop tanks equipped with individual refuelling probes but the idea was not adopted partly because at that time the RAAF had no aircraft suitable to act as an in-flight tanker.

There was also the suggestion that the Sabre could be turned in to an all-weather fighter with the addition of an air-intercept radar in a radome above the nose intake and a suitable air-to-air missile armament. This was studied in conjunction with the Firestreak missile trials but was not adopted, the RAAF instead looking at acquiring the Dassault Mirage III as a more suitable replacement for all the Sabres.

RAAF SABRE OPERATIONS

The first production Sabre Mk.30s were delivered to RAAF Williamtown from

Sabre on a pole. Former Greek Air Force Canadair Sabre Mk.2, 19448, used by the 'Hellenic Flame' aerobatic team, preserved at Nea Aghialos as seen on 2 April 1968 (Adrian Balch)

November 1954 where they formed the Sabre Conversion Flight within 2 (Fighter) Operational Training Unit (OTU), which was then mainly equipped with Vampires. They were initially used to convert experienced pilots to the type and to train a core of instructors, then to develop what were to become the type's standard operating procedures and tactics. Some 12 early production Mk.30s were eventually delivered and as more aircraft became available so the training could begin of pilots destined for the operational squadrons which were shortly to start forming. It took several years to build up the RAAF's fighter force because of the initial slow rate of Sabre deliveries, but eventually sufficient Mk.30s were available to re-equip 75 Squadron at Williamtown during April 1955, the squadron having previously flown Vampires. The next unit to operate Sabres was the newly formed 3 Squadron which received its first aircraft at Williamtown on 1 March 1956, followed by 77 Squadron which gave up its last Meteors that November. Thereafter these Sabre squadrons continued with routine operational training with most later receiving new Mk.31 aircraft whilst the original Mk.30s were progressively withdrawn for conversion to the Mk.31 standard. In due course these units were also issued with Mk.32s as they became available in sufficient numbers.

With this conversion programme nearing completion during the latter part of 1958, the RAAF undertook a reorganisation of its fighter force. By that time 2 OTU was operating Sabre Mk.31s and on 1 September 1958 it was re-designated 2 (F) Operational Conversion Unit to place greater emphasis upon the operational aspect of its role. Preparations had also begun for the transfer of No.78 Wing with two squadrons of Sabres to Malaya to assist RAF units of the Far East Air Force in operations against communist terrorists. The first to deploy to Butterworth on the west coast of the Malay peninsula was 3 Squadron, which made the move during November 1958, followed by 77 Squadron in February the following year. With the departure of No.78 Wing from Williamtown No.81 Wing was formed to take control of the remaining fighter assets but it was not until 1960 that its second front-line Sabre squadron was established. In June of that year the Citizens' Air Force (CAF) lost its flying squadrons in a reorganisation of the RAAF reserve forces, so 76 Squadron which had previously flown Vampires was re-equipped with Sabre Mk.30s and later Mk.31s, and took over some of the former CAF's flying commitments. Because it had no commitment to SEATO it remained at Williamtown as a resident air defence squadron for eastern Australia, and it also maintained a detachment at Darwin, Northern Territory to provide a fighter presence in the north of the country. For a period the squadron fielded the Red Diamonds then the Black Panthers display teams whose aircraft included A94-942, -947 and -983, whilst 75 Squadron also formed a team known as the Black Diamonds, using aircraft such as A94-353, -359 and -365.

With the Malayan Emergency over No.78 Wing was able to settle down to routine air defence operations providing cover for northern Malaya whilst the RAF was responsible for the south. However, by the 1960s South-East Asia was becoming increasingly unstable so Australia maintained a presence in the region as part of its commitment to the South-East Asia Treaty Organisation (SEATO) of which it was a member. US involvement in the increasingly bitter South-East Asia War was increasing and now Australia decided also to contribute forces to that theatre of operations. Accordingly on 1 June 1962 79 Squadron was formed in Singapore using Sabre Mk.32s and personnel drawn from Butterworth, and the same day moved to Ubon, Thailand to provide air defence for the important USAF bases in that part of the country. The Sabres remained at Ubon until July 1968 when the squadron disbanded, soon after the start of the Paris peace talks which it was hoped would end the fighting. The following month the squadron's aircraft and most of its personnel returned to Butterworth where they were absorbed into the other squadrons of No.78 Wing. At the time however, some reports claimed that the squadron actually returned to Butterworth where it continued flying operations until at least 1969, but this is unsubstantiated.

During this same period tension grew between Indonesia and Malaysia culminating in localised hostilities in what became known as The Confrontation. British forces in the region were kept on a high state of alert to defend Malaysian sovereignty and in this they were joined by Commonwealth forces. The RAAF Sabres assisted the RAF in defending Malaysian air space both from Butterworth and, from 1964, by providing detachments to RAF Changi, Singapore. These operations included flying standing patrols when necessary and also investigating unidentified air contacts, as well as being ready to support ground forces in the event of an Indonesian landing on Malaysian territory. The situation became particularly tense in Borneo necessitating a detachment of RAF aircraft being sent to Labuan to give support to Commonwealth forces in the area, and from October 1965 77 Squadron provided a Sabre detachment specifically for the air defence for Sabah and Sarawak. This military presence in the region was maintained for some time after Confrontation ended in August 1966 with No.78 Wing continuing to provide occasional Sabre detachments from Butterworth.

In the meantime back in Australia the front-line Sabre units had largely been re-equipped with the Mk.32 by 1962 although some earlier versions still probably served with 2 OCU, but already plans were well advanced for the introduction of the Sabre's successor, the Mirage IIIO. First deliveries of the Mirage were made to 2 OCU in March 1964 then from 1969 it also began to receive the Macchi MB.326H to replace the last of its Vampire trainers. During this period two parallel training programmes were run, one to provide an uninterrupted supply of pilots for the front-line Sabre squadrons and the other to train Mirage instructors who would then set about developing the type's operational procedures and producing the necessary training syllabus. Once these tasks were completed and sufficient Mirages had been delivered 2 OCU could set about training Mirage pilots for the front-line and the run-down of the Sabre training organisation could begin. The OCU also acted as a holding unit for Sabres as they were withdrawn from the squadrons re-equipping with the Mirage and probably maintained a pool of aircraft as a front-line reserve in case replacements were needed. It was during this period in the late 1960s that 2 OCU operated The Marksmen display team which used aircraft such as A94-365, -366 and -369.

The first unit to re-equip with the Mirage IIIO was 75 Squadron at Williamtown which received its first aircraft in early 1964 and was declared operational in August the following year, to be followed in 1966 by 76 Squadron which had converted by September. Once both No.81 Wing's squadrons were fully operational it was time to start re-equipping No.78 Wing, so in February 1967 3 Squadron returned to Williamtown with its Sabre Mk.32s to start the process of conversion. Its place at Butterworth was taken by 75 Squadron which moved to Malaysia that May. When it came to 77 Squadron's turn to receive Mirages, 3 Squadron returned to Butterworth in February 1969 allowing 77 Squadron to return to Australia shortly afterwards so that by July it had been fully re-equipped. With that accomplished the need for 2 OCU to train Sabre pilots ended and on 1 April 1970 it became responsible solely for Mirage training. On that date 5 Operational

Sabre Mk.6 FAC 2023, one of the six aircraft bought by the Colombian Air Force in June 1956 has been preserved at Bogota. (A.Balch)

Training Unit was established at Williamtown with the pool of remaining Sabres as well as the last few Vampires, although the latter had been replaced by MB.326Hs by September. This unit was tasked with providing tactical jet flying training for pilots due to go to 2 OCU as well as jet refresher flying, and it also provided banner target facilities and targets for airborne interception exercises for the OCU's Mirage courses. However, after barely a year's operations 5 OTU was disbanded on 31 July 1971 and its Sabres placed in storage at Williamtown pending disposal, so marking the end of the Sabre's career with the RAAF.

Several examples were preserved for display purposes such as A94-941 which went to Fisherman's Bend and A94-951 which remained at RAAF Williamtown, whilst the prototype A94-101 was put on display at the RAAF Academy, Point Cook, Victoria. Others were disposed of to various museums as with A94-914 to Darwin, NT and A94-989 to Moorabin, Victoria. At least A94-922 appeared on the civil register becoming VH-SRE, but this was later transferred to Kbely Museum in the Czech Republic. Another Sabre to gain a civil registration was VH-PCM but this aircraft was obtained later from Malaysia, having formerly been FM1983.

OVERSEAS CUSTOMERS FOR AUSTRALIA'S SABRES

Malaysia: Once No.78 Wing at Butterworth had re-equipped with Mirage IIIOs in February 1969 it was agreed that under the Australian Defence Aid Programme some of the RAAF's surplus Sabres would be transferred to the Royal Malaysian Air Force (RMAF). This would allow it to establish a fighter force of its own as part of an expansion programme in preparation for when British forces finally withdrew from the Far East. On 15 April it was announced that before the end of the year the RMAF was to receive a gift of 10 Sabre Mk.32s and the Sabre simulator at Butterworth, together with spares and ground equipment, and that the Australians would undertake the training of the RMAF pilots and engineers. At the time RMAF plans called for two Sabre squadrons which would build up a core of experienced fighter pilots, then for the Sabres to be replaced by a modern jet fighter of significantly higher performance in about six years' time. By then it was hoped that the Integrated Air Defence System covering Malaysia, Singapore and Australia would have been established.

In April 1969 the RAAF set up a Sabre training school at Butterworth using a number of redundant Sabres as ground instruction airframes, initially to train maintenance personnel. Thereafter, from about August the Sabre Advisory Flight operated the refurbished Sabres as they were delivered, on behalf of the RMAF, and began converting RMAF pilots to the type. During the course of the year 11 (Cobra) Squadron was established at Butterworth and officially formed as a Sabre squadron on 1 October. There then followed a period of operational conversion training under the supervision of the Australians with the first Malaysian pilots qualifying in April the following year, and by the end of 1970 11 Squadron was operational and working alongside the Mirages of No.78 Wing.

This remained the situation until November 1971 when a further six newly refurbished Sabre Mk.32s were delivered to 11 Squadron, together with A94-357 for use as a ground instructional airframe. These were originally to have gone to form the second Sabre squadron but instead seem to have gone to expand 11 Squadron, then once the final group of new pilots had qualified on type the Sabre Advisory Flight was disbanded in February 1972. One further ground instructional Sabre, A94-356, was delivered to the RMAF in February 1974. It appears that 11 Squadron then continued operating the Sabre until the type was withdrawn from service in April 1976, when it was replaced at Butterworth by 12 (Lightning) Squadron which had reportedly formed there with Northrop F-5Es in June the previous year. However, there is still doubt about the exact sequence of events, which seems to have gone unreported at the time.

It is possible that 12 Squadron did actually form at Butterworth in 1971 when the extra Sabres were delivered and that the two units operating side by side until the F-5Es were ready for delivery, at which time 11 Squadron possibly disbanded around mid-1975. From then on 12 Squadron possibly continued flying the remaining Sabres until sufficient F-5s had been delivered, at which time it was able to dispense with the last of the Sabres. Of the remaining examples some were put on display at Butterworth or simply dumped around the airfield probably as decoys, five were

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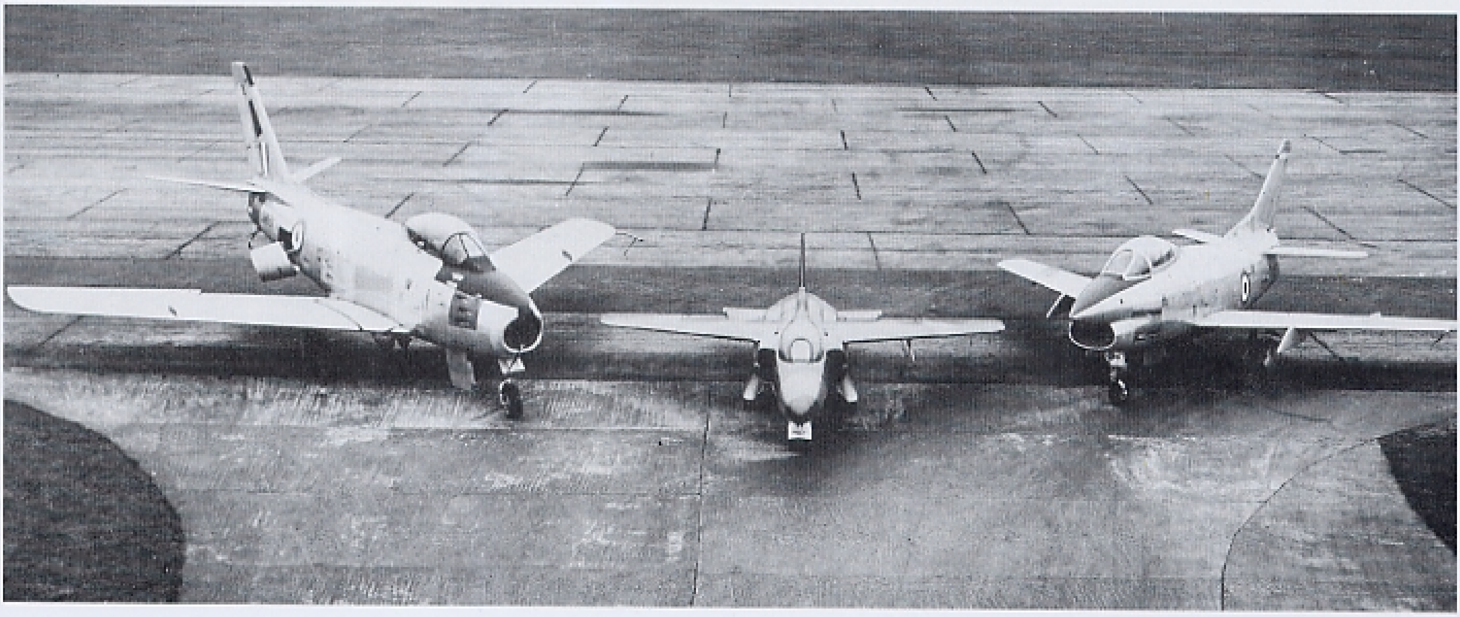
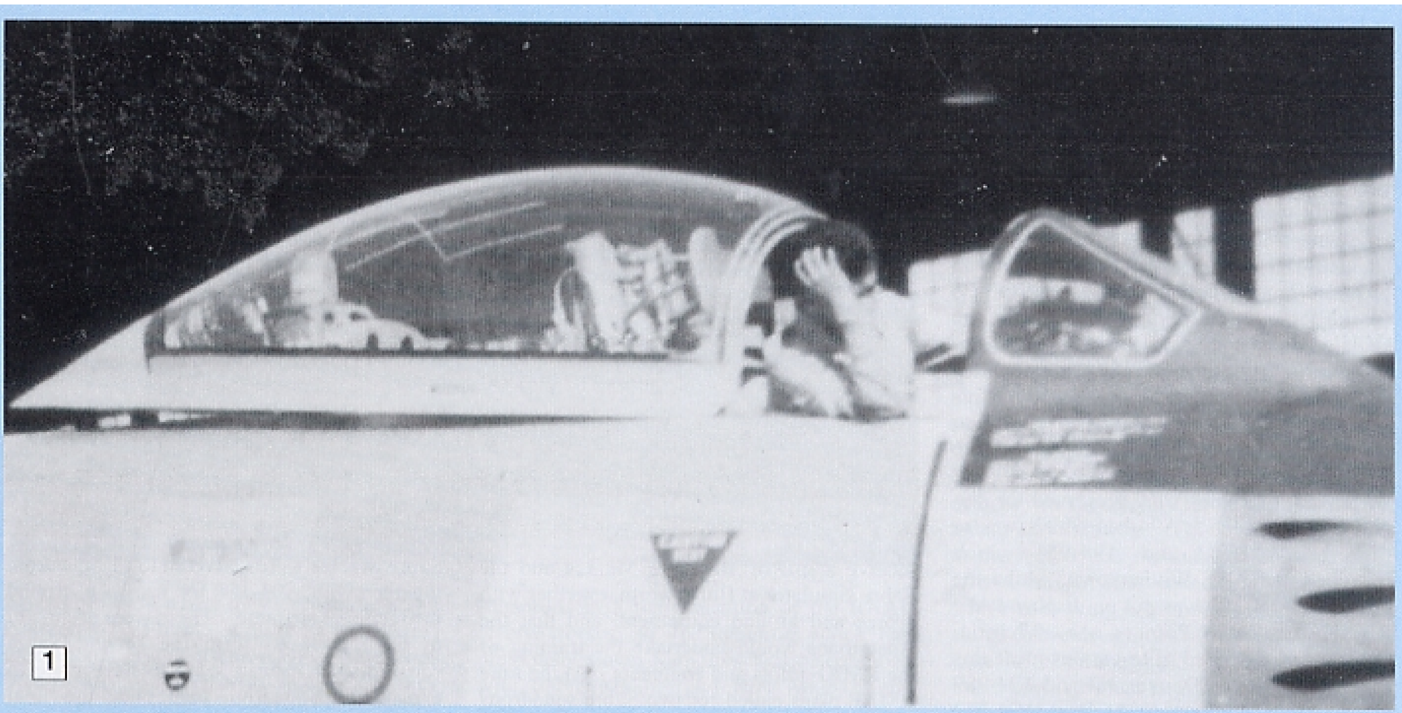


The only Canadair Sabre in the UK that was used for experimental work was Mk.4 XB982 although some went to RAE and A&AEE. This aircraft in common with Folland Gnat XL740 and Fiat G.91 MM6246 (G-45/5) went to Bristol for the experimental installation of the Bristol Siddeley Orpheus engine (Terry Panapolis)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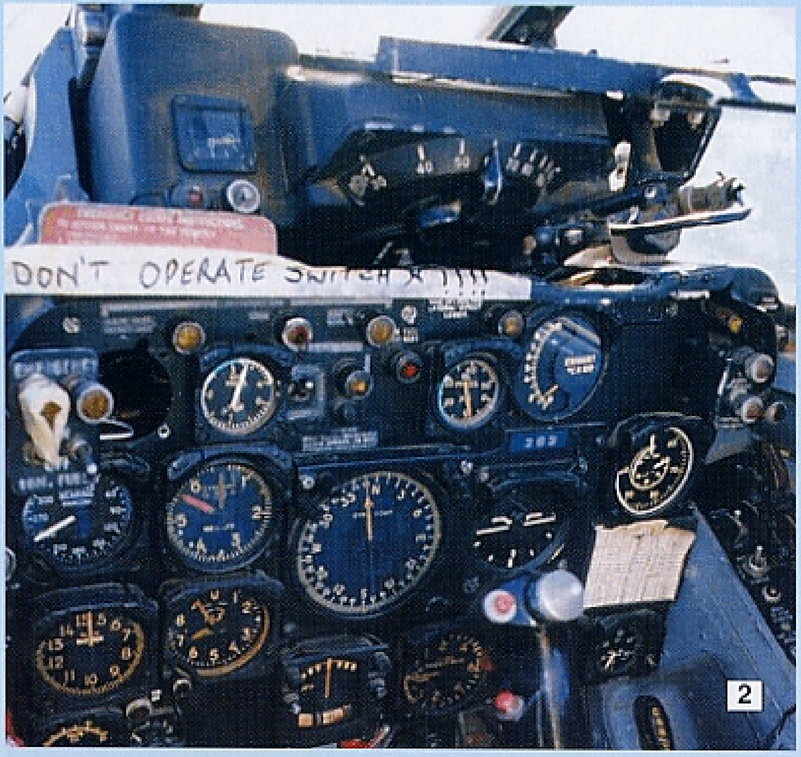
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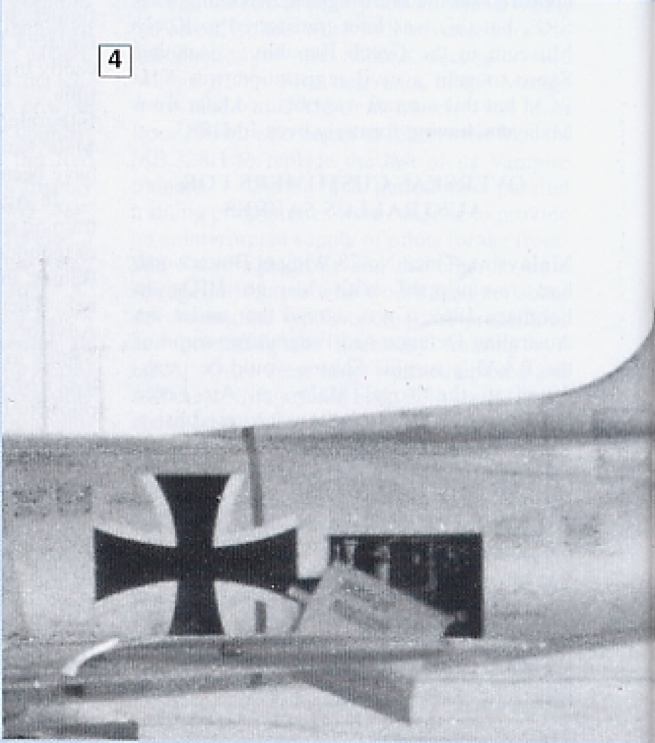
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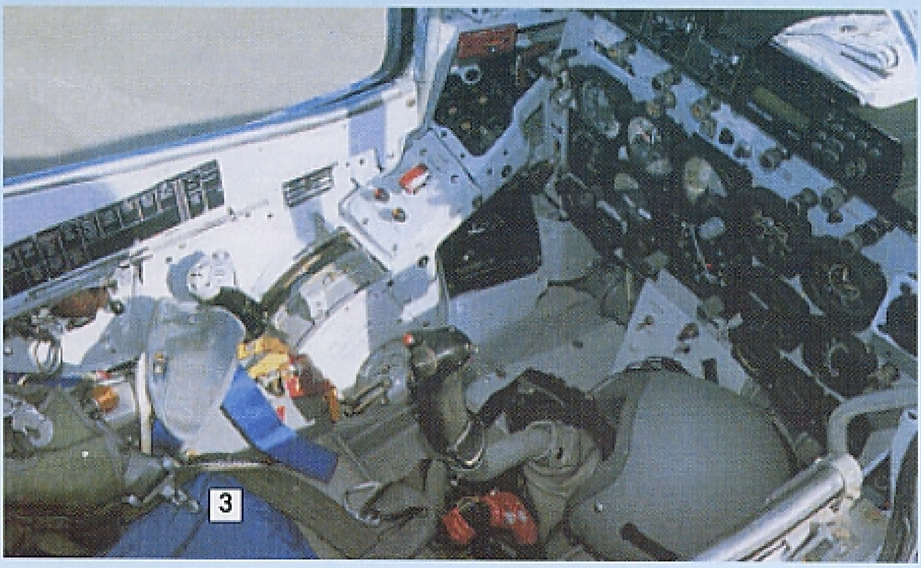
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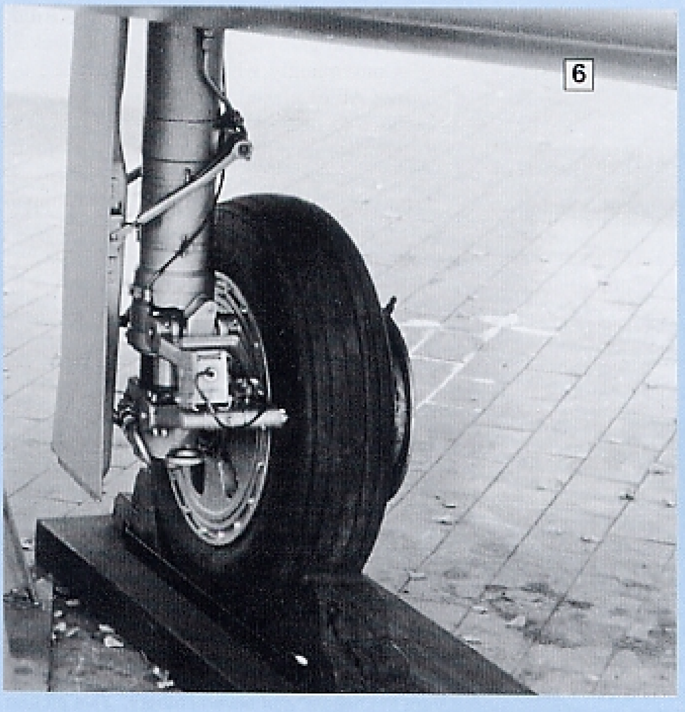
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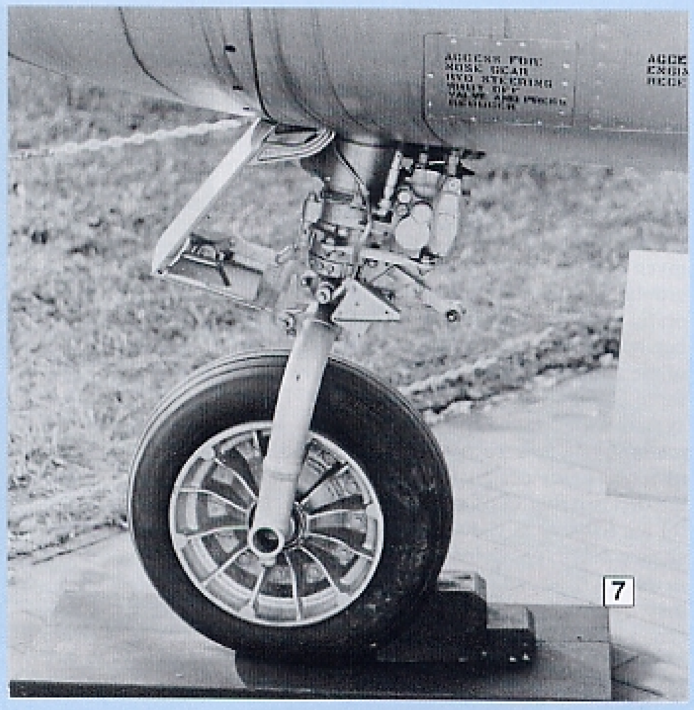
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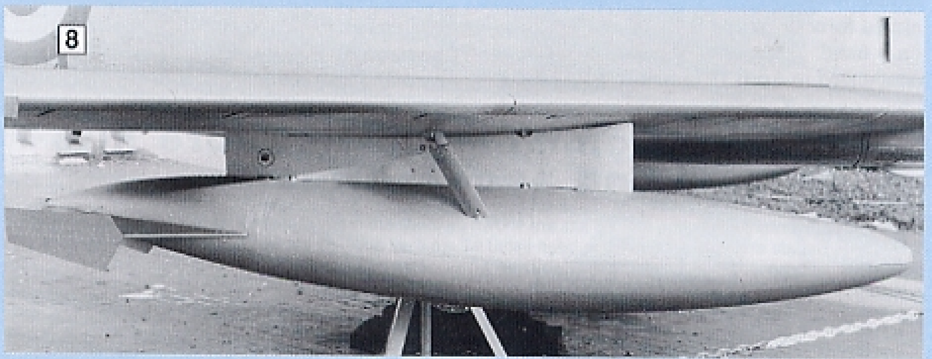
SABRE IN DETAIL

Photographs by Terry Panapolis, APN and Adrian Balch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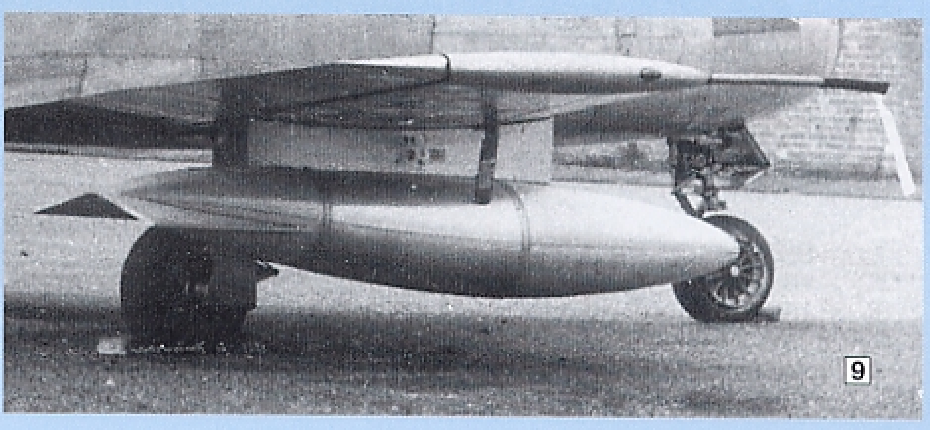
1. The Sabre's canopy and top of the ejection seat. This is a South African aircraft which had the IFF equipment behind the pilot's seat and the original North American ejection seat. 2 and 3. Interior of a CL-13 Sabre showing cockpit instruments and the left hand panel. 4. The CL-13's rear fuselage. The dive brakes are extended and the fuel jettison pipe is evident on the rear under the jet pipe. 5. CL-13 nose intake and machine gun ports. The top of the intake houses the elementary radar ranging equipment linked to the pilot's fire control system. 6. The starboard main undercarriage leg The Sabre had a very narrow track on its main wheels.. 7. The nose wheel. Nose wheels varied in either solid or fluted as in this example. Variations were considerable between both Canadair and Commonwealth variants. 8. Sabres were fitted with long range tanks and included the double rear end fins. This one belonged to an Italian air force example. Note the stabilising strut that fitted from the tank to the wing underside. 9. The RAF Germany examples originally had the swept down small fins on the rear of the drop tank. These were later changed to those above.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passed on to Indonesia in August 1976 and A94-983 was returned to Australia for the RAAF Historic Flight. Others were put on display at various locations in Malaysia, such as FM1902 in Sungai Besi and FM1904 in Kuala Lumpur. Two others were still in use as instructional airframes until at least 1982.

In Malaysian service the Sabres were all given RMAF serial numbers, including the ground instructional airframes, all with the prefix 'FM' for Federation of Malaysia. To begin with the Malaysian serial was made up of the number group from the original RAAF serial with a figure '1' prefix, but by 1971 the system had changed. The 'FM' prefix was retained but now each aircraft type had its own two-figure designator which appeared as the first two figures of its four-digit serial, and for the Sabre this type number was '19'. By chance the Sabres delivered in 1971 were all in the RAAF serial range A94-946 to -987 so they retained their full Australian number group with a '1' prefix, but the earlier Sabres were all re-numbered. In all cases these retained the last digit of their former serial number but this was now preceded by either a '9' or a '0', as with FM1359 which was re-numbered FM1999, and FM1362 which became FM1902.

The end of the line for many Canadair Sabres in RCAF service in Europe was the Staravia scrapyard at Lasham, and several others. This picture was taken in February 1969 before they were all reduced to scrap. (Adrian Balch)

Indonesia: Despite the period of Confrontation during the first half of the 1960s, by the beginning of the next decade and after a change of leadership in Indonesia the political situation had improved sufficiently for Australia to declare its willingness to help in the modernisation of the Indonesian armed forces. With plenty of surplus Sabres on hand the Australian government announced in April 1972 that it would donate 16 Sabre Mk.32s to the Indonesian Air Force (AURI until 1974, then TNI-AU) most of whose assortment of MiG fighters were no longer airworthy due to lack of spares. The Sabres were to be delivered during early 1973 following refurbishment at Williamtown, and by the time this initial order was completed 19 aircraft had actually been supplied. Two of these extra Sabres were accounted for by a replacement aircraft for A94-352 which had crashed on Bali during its delivery flight but which was salvaged and eventually returned to Australia, and A94-955, an extra Sabre which appears to have been delivered during November 1973 and became F-8617. There was also A94-370 which had been supplied as a ground instructional airframe. In Indonesian service the Sabres were referred to as F-86s and were given sequential serial numbers from F-8601, although it is not known if A94-370 ever received an Indonesian serial.

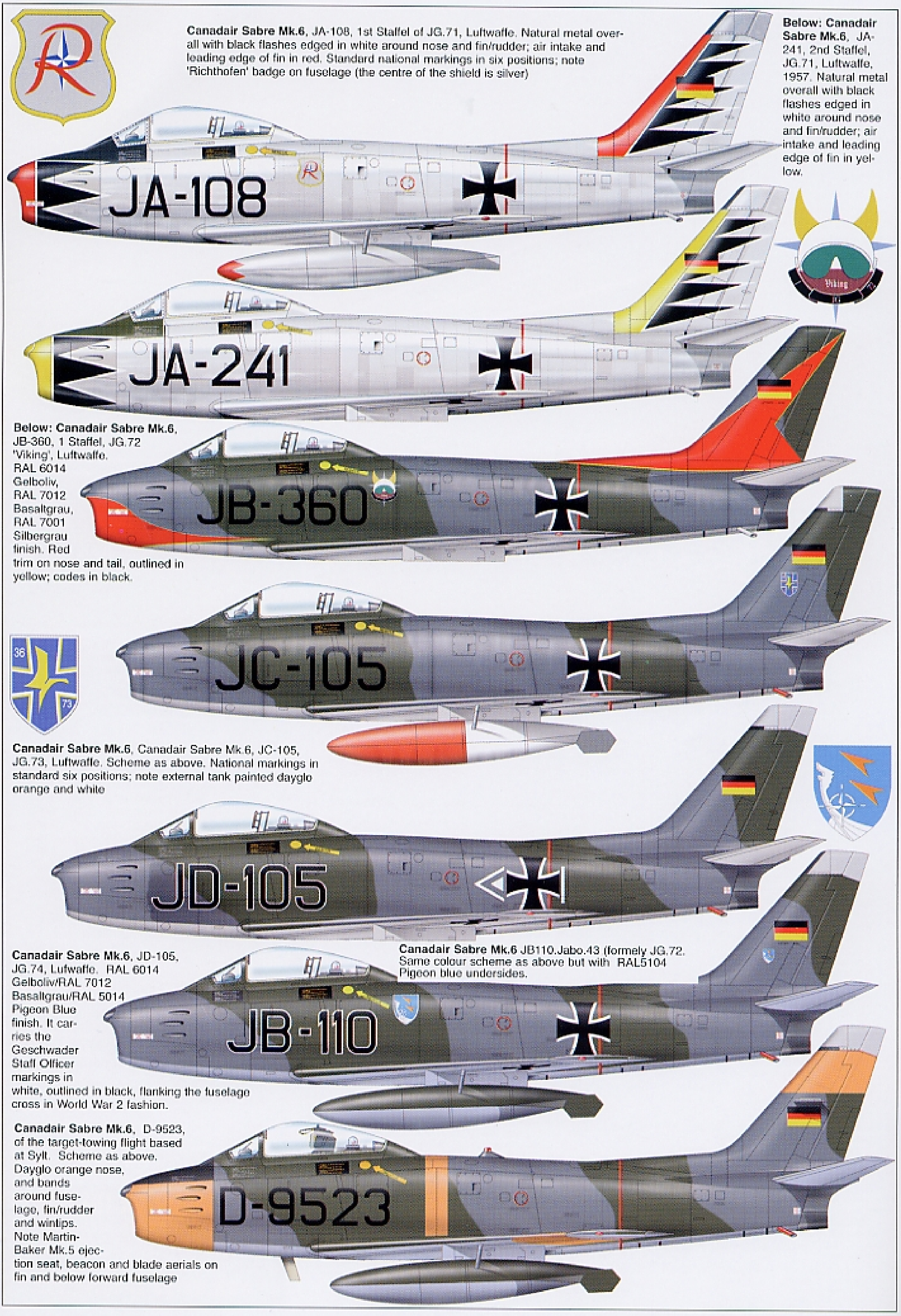
During 1972 AURI pilots and engineering personnel underwent training at Williamtown at the same time as RAAF personnel and contractors went to Indonesia to prepare facilities at Iswahjudi air base, East Java, ready for the arrival of the Sabres. At the end of the year A94-370 was delivered by sea from Sydney to be used to test the various airfield facilities and also to give engineering staff practical experience of working on a real Sabre. This was followed in February 1973 by the Sabres themselves which were ferried to Bali in two batches by RAAF pilots and then flown the final leg to Iswahjudi by Indonesian pilots. The final aircraft arrived on 23 February, this being the replacement for A94-352, and they were all formally handed over to 14 Squadron of the AURI on 9 April. However, following a reorganisation of the Indonesian armed forces in mid-1974, at which time there were only two active combat squadrons, one equipped with Mustangs and 14 Squadron with its Sabres, the latter was re-designated 'Satuan Sergap F-86' (Fighter Unit F-86).

By 1976 accidents had taken their toll of the Sabre force so in an ironic twist of fate in July the TNI-AU bought five redundant Sabre Mk.32s to make up for these losses, but this time from its erstwhile enemy Malaysia. The Sabre then continued in front-line service until late 1980 when it was replaced by Northrop F-5Es, although from 1 September 1978 the squadron had reverted to its original number, now being referred to as Skwadron Udara 14 (Air Squadron 14). Some of the redundant airframes were put on display whilst several others were used as ground instructional airframes by the TNI-AU. At least eight aircraft were eventually bought by a businessman and exported to the USA in 1989, presumably for refurbishment and onward sale to warbird enthusiasts, whilst F-8618 found its way back to Australia.

Canadair/Commonwealth Sabre kits and accessories

Only a representaive selection of F-86 kits are shown as there are many more in a variety of markings mostly USAF. Decals and accessories have been listed where they apply to the two aircraft types in this book

Scale	Type	Manufacturer	Remarks
Kits			
1:144	F-86F Sabre	Aeroclub	Vaculorm and white metal kit
1:72	F-86F Sabre	Fujimi	Suitable for conversion
1:72	F-86F Sabre	Airfix	Suitable for conversion
1:48	QF-86 Sabre	Hasegawa	Full size drone
1:72	F-86E	Hobbycraft	Injection moulded USAF markings
1:72	Canadair Sabre Mk.5	Hobbycraft	RCAF decals
1:72	Canadair Sabre Mk.6	Hobbycraft	RCAF decals
1:72	CL-13B Sabre	Heller	Injection moulded kit
Accessories			
1:144	F-86F Sabre	Aeroclub	Vacuform drop tanks
1:72	F-86F Sabre	Aeroclub	Ejection seat
1:72	F-86 Sabre	Aeroclub	Undercarriage set
1:48	F-86E Sabre	Airwaves	Slated wing with drop tanks
1:48	F-86F-40 Sabre	Cutting Edge	Sabre Mk.6 slats
1:72	F-86 Sabre	Eduard	Cockpit interior
1:72	F-86 Sabre	Eduard	Slats set
1:72	F-86 Sabre	Eduard	Undercarriage set
1:48	F-86A/E Sabre	Eagle Talon	Seperate flaps, decals, cockpit tub
1:48	F-86F Sabre	High Tech	Cockpit tub, combing, flaps
1:48	F-86 Sabre	Kendall	Intake set
Decals			
1:48	F-86E/F Sabre	Flight Dec	Yugoslav AF. Contains F-86E/F
1:48	CL-13 Sabre	Leading Edge	Golden Hawks
1:32	CL-13 Sabre Mk.6	Leading Edge	RCAF 2 Wing
1:48	CL-13 Sabre	Leading Edge	Golden Knights display team
1:72	CL-13 Sabre Mk.6	Leading Edge	Golden Hawks
1:48	CL-13 Sabre Mk.6	Leading edge	RCAF 2 Wing
1:32	CL-13 Sabre Mk.6	Leading Edge	Golden Hawks
1:48	F-86 Sabre	Superscale	Contains RCAF, Columbian AF, Italian AF
1:72	F-86 Sabre	Superscale	Contains RCAF, Columbian AF, Italian AF
1:32	F-86 Sabre	Tauro	Cavallina Rampante
1:32	F-86 Sabre	Tauro	Contains squadron badges and markings
1:48	F-86 Sabre	Tauro	Contains Frecce Tricolori
1:48	F-86E/F Sabre	Tauro	Cavallino Rampante, Getti, Lanceri Neri



Canadair Sabre Mk.6, JA-108, 1st Staffel of JG.71, Luftwaffe. Natural metal overall with black flashes edged in white around nose and fin/rudder; air intake and leading edge of fin in red. Standard national markings in six positions; note 'Richthofen' badge on fuselage (the centre of the shield is silver)

Below: Canadair Sabre Mk.6, JA-241, 2nd Staffel, JG.71, Luftwaffe, 1957. Natural metal overall with black flashes edged in white around nose and fin/rudder; air intake and leading edge of fin in yellow.

Below: Canadair Sabre Mk.6, JB-360, 1 Staffel, JG.72 'Viking', Luftwaffe. RAL 6014 Gelboliv, RAL 7012 Basaltgrau, RAL 7001 Silbergrau finish. Red trim on nose and tail, outlined in yellow; codes in black.

Canadair Sabre Mk.6, Canadair Sabre Mk.6, JC-105, JG.73, Luftwaffe. Scheme as above. National markings in standard six positions; note external tank painted dayglo orange and white

Canadair Sabre Mk.6, JD-105, JG.74, Lufwaffe. RAL 6014 Gelboliv/RAL 7012 Basaltgrau/RAL 5014 Pigeon Blue finish. It carries the Geschwader Staff Officer markings in white, outlined in black, flanking the fuselage cross in World War 2 fashion.

Canadair Sabre Mk.6 JB110.Jabo.43 (formely JG.72. Same colour scheme as above but with RAL5104 Pigeon blue undersides.

Canadair Sabre Mk.6, D-9523, of the target-towing flight based at Sylt. Scheme as above. Dayglo orange nose, and bands around fuselage, fin/rudder and wintips. Note Martin-Baker Mk.5 ejection seat, beacon and blade aerials on fin and below forward fuselage

An impressive night publicity picture of an RCAF Sabre Mk.5 during a gun alignment demonstration. Six .5 calibre guns packed a very powerful punch. (Adrian Balch)

Canadair/ Commonwealth Sabre technical data

CL-13 Sabre Mk.1
Dimensions:
Fuselage length: 37 ft 6 in. Wing span: 37 ft 1 in. Tailplane span: 12 ft 9 in. Height: 14 ft 9 in. Undercarriage track: 8 ft. 4 in. Wing area: 287.9 sq ft.
Engine:
1 x General Electric J47-GE-13 engine rated at 4,320 lb s.t. (normal), 5,200 lb s.t. (max.).
Performance:
Max. speed: 590 kts at sea level, 522 kts at 35,000 ft. Max. rate of climb: 7,470 ft/min at sea level. Time to 40,000 ft: 10 min 24 sec. Service ceiling: 48,000 ft. Range with 2 x drop tanks: 914 nm.
Weight:
Empty: 10,093 lb. Basic: 10,536 lb. Take-off (clean): 14,108 lb.
Armament:
6 x 0.5 inch M-3 fixed machine guns with 1,800 rounds (total). 2 x 1,000 lb, 500 lb or 100 lb bombs. 2 x 500 lb fragmentation bombs. 2 x 750 lb napalm tanks. 16 x 5 inch unguided rockets. 2 x 100 imp.gal. drop tanks, or 2 x 165 imp.gal. ferry tanks.

CL-13 Sabre Mks.2 and 4
Dimensions:
As for Mk.1.
Engine:
As for Mk.1.
Performance:
Max. speed 585 kts at sea level. Max. rate of climb: 7,470 ft/min at sea level. Time to 40,000 ft: 18 mins. Service ceiling: 52,500 ft.
Weight:
Empty: 11,100 lb. Take-off (clean): 14,640 lb.
Armament:
As for Mk.1.

CL-13A Sabre Mk.5
Dimensions:
As for Mk.1 except Wing area: 302.26 sq ft.
Engine:
1 x Avro Orenda 9 engine rated at 5,870 lb s.t. (normal), 6,355 lb s.t. (max.).
Performance:
Time to 40,000 ft: 9 mins. Service ceiling: 50,700 ft.
Weight:
Empty: 11,365 lb. Take-off (clean): 14,936 lb.
Armament:
As for Mk.1.

CL-13B Sabre Mk.6
Dimensions:
As for Mk.5.
Engine:
1 x Avro Orenda 14 engine rated at 7,275 lb s.t. (max.).
Performance:
Max. speed: 617 kts at sea level, 547 kts at 36,000 ft. Time to 40,000 ft: 6 mins. Max. rate of climb: 11,800 ft/min at sea level. Range with 2 x drop tanks: 1,298 nm.
Weight:
Empty: 10,850 lb. Take-off (clean): 14,370 lb.
Armament:
As for Mk.1, except some German aircraft modified to carry 2 x AIM-9 Sidewinder IR air-to-air missiles.

COMMONWEALTH SABRE TECHNICAL DATA

CA-27 Sabre Mk.32
Dimensions:
Fuselage length: 37 ft 6 in. Wing span: 37 ft 1 in. Tailplane span: 12 ft 9 in. Height: 14 ft 5 in. Undercarriage track: 8 ft 4 in. Wing area: 312 sq ft.
Engine:
1 x Commonwealth-built Rolls-Royce Avon RA.7 Mk.26 engine, rated at 7,500 lb s.t. at sea level.
Performance:
Max. speed: 608 kts (M 0.92) at sea level, 527 kts at 38,000 ft. Max.rate of climb: 12,000 ft/min at sea level. Service ceiling: 55,000 ft. Range with 2 x drop tanks: 1,000 nm.
Weight:
Empty: 12,120 lb. Take-off (clean): 15,990 lb.
Armament:
2 x 30mm fixed Aden cannon with 360 rounds (total). 2 x 1,000 lb or 500 lb bombs. 2 x 750 lb napalm tanks. 2 x 500 lb fragmentation bombs. 2 x 100 imp. gal. drop tanks, or 2 x 167 imp. gal ferry tanks. 2 x AIM-9 Sidewinder IR air-to-air missiles.

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